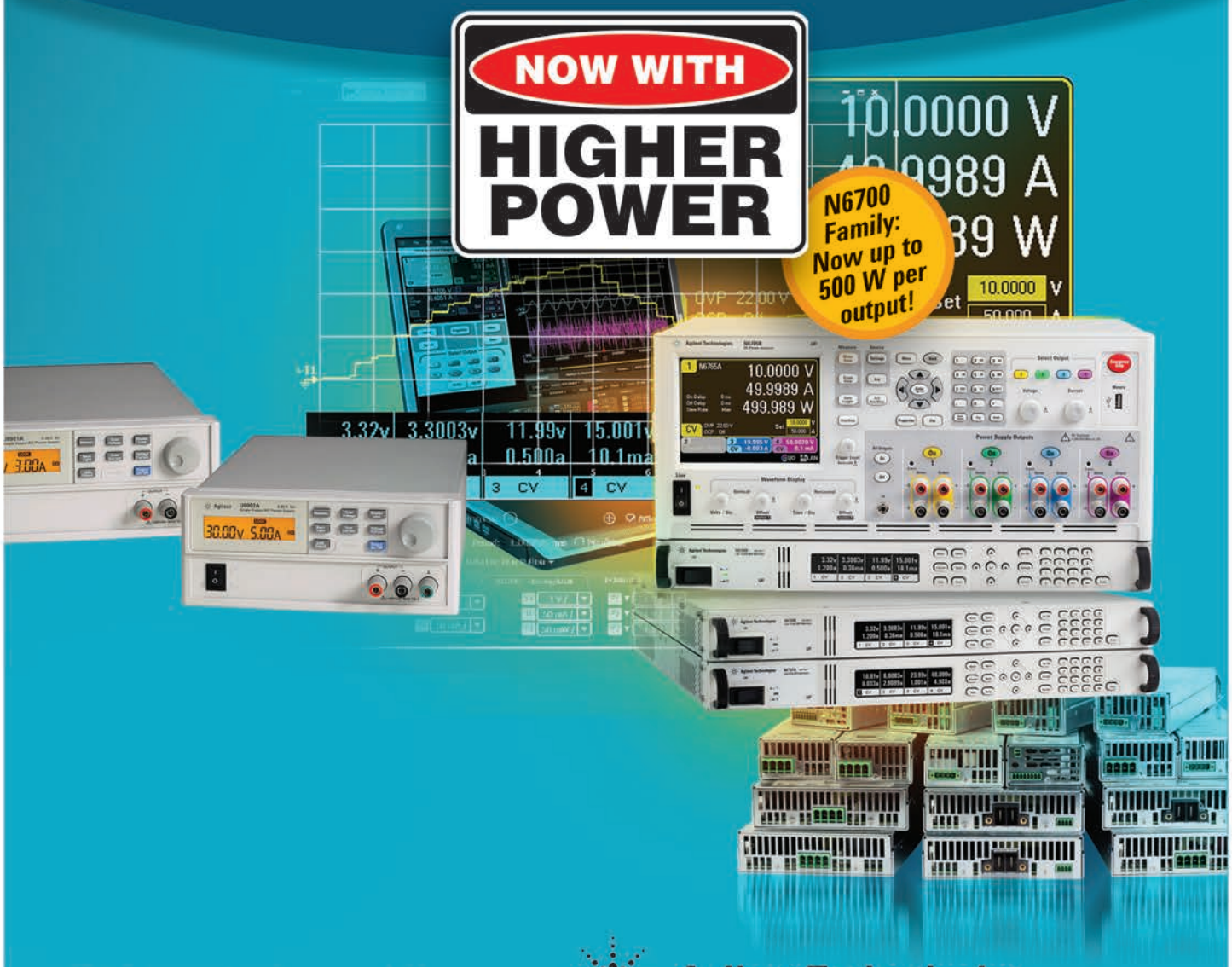
Power Products Catalog

FOR DISTRIBUTION

August 2012

Detailed specifications,
application briefs and more for:

DC Power Supplies
DC Electronic Loads
AC Power Solutions



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Agilent Technologies

52 NEW High Power DC Supplies from Agilent

Agilent N6900 and N7900 Advanced Power System Family with VersaPower Architecture

Overcome your toughest power test challenges

- 1 kw and 2 kW models (expandable to 10 kW)
- Up to 160 V, up to 200 A
- Increase system throughput (with programming speeds up to 350 µs)
- Test power storage devices with full two-quadrant operation
- Characterize dynamic current profile (18-bit digitizer)
- Protect high-value DUT with smart triggering

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Agilent N8900 Series Autoranging System DC Power Supplies

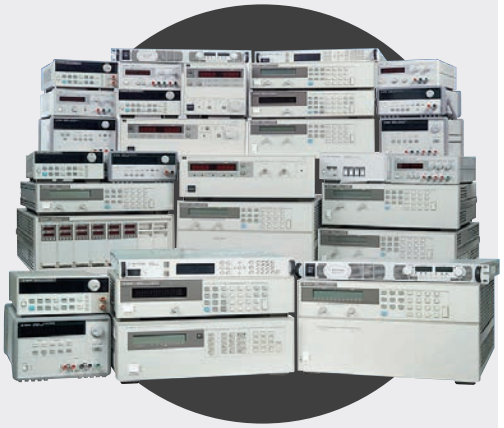
High-power, autoranging output does the job of multiple supplies

- 5 kW, 10 kW and 15 kW models (expandable to >100 kW)
- Up to 1500 V, up to 510 A
- Autoranging output – like many power supplies in one!
- Protection from over-voltage, over-current and over-temperature
- Just the right amount of performance, at just the right price

www.agilent.com/find/N8900

Solutions

to match your new test and measurement challenges. Choosing from over 200 models of power supplies with confidence. Because Agilent knows how to make power products.



One quick browse through this catalog will convince you that Agilent power products offer so much more than simple power generation. In each power product category, we've integrated the capabilities you need for a complete solution. Agilent Technologies' broad selection of both bench-friendly and system-ready instruments can meet your testing challenges — from basic to complex — with a wealth of available capabilities. With over 40 years of leadership in power test solutions, Agilent continues to introduce a variety of dependable products to help you decrease your test time and speed design validation.

This catalog includes easy to use selection guides for each power product category to help you select the best power supply for your application. For the most comprehensive product information, we've provided a unique URL to each product's website where you can find data sheets and application notes, download drivers, and view videos and interactive demos.

Products you can count on year after year

We've been a leader in the power and measurement business for more than four decades because engineers like you know they can count on Agilent performance and reliability. We specify and guarantee performance for the entire integrated system, so you know what you're really dealing with–unlike the typical "rack-and-stack" setup. Plus, every Agilent product in this catalog has a global warranty.

We know you have more important things to do than shop around for power products. That's why we've made such a wide range of products available through Agilent. The experienced engineers at Agilent can help you select just the right solutions for your application and your budget, then arrange fast shipping so you can get to work in a hurry.

New Products

N6705B DC Power Analyzer

N6705B DC Power Analyzer

The Agilent N6705B DC power analyzer provides unrivaled productivity gains for sourcing and measuring DC voltage and current into the DUT by integrating up to 4 advanced power supplies with DMM, Scope, Arb, and Data logger features. The N6705B eliminates the need to gather multiple pieces of equipment and create complex test setups including transducers (such as current probes and shunts) to measure current into your DUT. The DC Power Analyzer also eliminates the need to develop and debug programs to control a collection of instruments and take useful measurements because all functions and measurements are available at the front panel. When automated bench setups are required, the N6705B is fully programmable over GPIB, USB, LAN and is LXI Class C Compliant.

For even greater control and analysis functions, the DC Power Analyzer can be used with the 14585A Control and Analysis Software. The 14585A software compliments the front panel of the N6705 DC power analyzer, offering advanced functionality such as statistical analysis tools and PC control. It is a flexible R&D tool for any application that can be utilized to control any of the N6700 family's greater than 20 DC power modules with the N6705.

See Page 92

N6755A/N6756A High-Performance Autoranging DC Power Modules

N6755A/N6756A High-Performance Autoranging DC Power Modules

The Agilent N6755/N6756A are 500 W high-performance, autoranging DC power modules that provide low noise, high accuracy and programming speeds that are up to 10 to 50 times faster than other programmable power supplies. Optional high-speed test extension offers an oscilloscope-like digitizer that increases measurement accuracy when viewing high-speed transient or pulse events within the device-under-test (DUT). These modules are a part of the N6700 modular power system, which consists of the N6700 low-profile mainframes for ATE and the N6705 DC power analyzer mainframe for R&D.

See Pages 75 and 92

New Products (continued)

N6763A - N6766A
Precision DC Power Modules

N6763A - N6766A Precision DC Power Modules
The Agilent N6763A/N6764A are 300 W and the N6765A/N6766A are 500 W precision DC power modules that provide low noise, and precise control and measurements in the milliampere and microampere region with the ability to simultaneously digitize voltage and current, and capture those measurements in an oscilloscope-like data buffer. These modules are a part of the N6700 modular power system, which consists of the N6700 low-profile mainframes for ATE and the N6705 DC power analyzer mainframe for R&D.

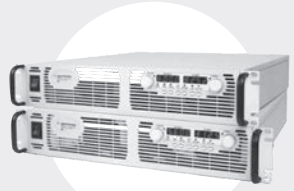
See Pages 78 and 93

N6777A DC Power Module

N6777A DC Power Module
The Agilent N6777A is a 300 W basic DC power module that provides programmable voltage and current, measurement and protection features at a very economical price, making this module suitable to power the DUT or to provide power for ATE system resources such as fixture control. This module is a part of the N6700 modular power system, which consists of the N6700 low-profile mainframes for ATE and the N6705 DC power analyzer mainframe for R&D.

See Pages 82 and 92

N8700 Series
System DC Power Supplies



N8700 Series System DC Power Supplies
The Agilent Technologies N8700 series system DC power supplies give you just the right performance — at just the right price — in a compact (2 U) package. This family of affordable 3300 W and 5000 W single-output programmable DC power supplies consists of 21 models for simple DC power applications.

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More detailed specifications at **www.agilent.com/find/power**

DC Power Supply Selection Index

Maximum volts	Maximum amps	Maximum watts	Number of outputs	GPIB	Model number	Type	Page number
3	300	900	1	*	**6671A-J08**	Performance	57
3.3	1000	3300	1	*	**6680A-J04**	Performance	67
5	10	50	up to 4	*	**N6731B**	Basic	84, 92
5	20	100	up to 4	*	**N6741B**	Basic	86, 92
5	875	4400	1	*	**6680A**	Performance	67
5.7	20	100	up to 8	*	**66101A-J03**	Performance	89
6	2.5	15	3		**E3630A**	Basic	18
6	5	30	3	*	**E3631A**	Basic	19
6	60	360	1	*	**6551A-J03**	Performance	53
6	60	360	1	*	**6651A-J03**	Performance	49
6	100	600	1	*	**N5741A**	Basic	27
6	180	1080	1	*	**N5761A**	Basic	30
6.7	30	200	1	*	**6033A**	Autoranging	24
7	0.015	0.11	2	*	**6625A**	Performance	73
7	0.015	0.11	4	*	**6626A**	Performance	73
7	5	35	3	*	**6623A**	Performance	71
7	5	35	4	*	**6624A**	Performance	71
7	10	70	2	*	**6621A**	Performance	71
7	10	70	3	*	**6623A**	Performance	71
7	120	1000	1	*	**6031A**	Autoranging	24
8	3	24	1		**E3610A**	Basic	16
8	3	24	1	*	**E3640A**	Basic	22
8	3	24	2	*	**E3646A**	Basic	23
8	5	40	1	*	**6611C**	Performance	38
8	5	40	1	*	**E3642A**	Basic	22
8	5	40	2	*	**E3648A**	Basic	23
8	6	48	1		**E3614A**	Basic	16
8	6.25	50	up to 4	*	**N6732B**	Basic	84, 92
8	8	80	1	*	**E3644A**	Basic	22
8	10	80	1	*	**6631B**	Performance	40
8	12.5	100	up to 4	*	**N6742B**	Basic	86, 92
8	16	128	up to 8	*	**66101A**	Performance	88
8	20	160	1		**6541A**	Performance	45
8	20	160	1	*	**6641A**	Performance	42

More detailed specifications at **www.agilent.com/find/power**

DC Power Supply Selection Index (Continued)

Maximum volts	Maximum amps	Maximum watts	Number of outputs	GPIB	Model number	Type	Page number
8	20	160	1	*	**E3633A**	Basic	20
8	50	400	1		**6551A**	Performance	52
8	50	400	1	*	**6651A**	Performance	48
8	90	720	1	*	**N5742A**	Basic	27
8	165	1320	1	*	**N5762A**	Basic	30
8	220	1760	1		**6571A**	Performance	63
8	220	1760	1	*	**6671A**	Performance	56
8	400	3200	1	*	**N8731A**	Basic	32
8	580	4600	1	*	**6681A**	Performance	67
10	5	50	1	*	**6611C-J05**	Performance	38
10	50	500	1		**6551A-J01**	Performance	53
10	50	500	1	*	**6651A-J01**	Performance	48
10	200	2000	1		**6571A-J04**	Performance	64
10	200	2000	1	*	**6671A-J04**	Performance	57
10	330	3300	1	*	**N8732A**	Basic	32
12	12	150	up to 8	*	**66101A-J05**	Performance	89
12.5	60	750	1	*	**N5743A**	Basic	27
12.5	120	1500	1	*	**N5763A**	Basic	30
13	15.3	200	1		**6541A-J04**	Performance	46
13	15.3	200	1	*	**6641A-J04**	Performance	43
14	150	2000	1		**6571A-J03**	Performance	63
14	150	2000	1	*	**6671A-J03**	Performance	57
15	2	30	1		**E3610A**	Basic	16
15	7	105	1	*	**E3632A**	Basic	20
15	10	150	up to 8	*	**66102A-J05**	Performance	89
15	120	1800	1		**6571A-J17**	Performance	64
15	120	1800	1	*	**6671A-J17**	Performance	57
15	220	3300	1	*	**N8733A**	Basic	32
15	440	6600	1	*	**6690A**	Performance	69
16	0.2	3.2	2	*	**6625A**	Performance	73
16	0.2	3.2	4	*	**6626A**	Performance	73
16	0.2	3.2	2	*	**6628A**	Performance	73
16	0.2	3.2	4	*	**6629A**	Performance	73
17	30	510	1	*	**6651A-J09**	Performance	49
20	0.5	10	3		**E3630A**	Basic	18
20	1.5	30	1		**E3611A**	Basic	16
20	1.5	30	1	*	**E3640A**	Basic	22
20	1.5	30	2	*	**E3646A**	Basic	23
20	2	40	1	*	**6612C**	Performance	38
20	2	40	3	*	**6623A**	Performance	71
20	2	40	4	*	**6624A**	Performance	71
20	2	40	4	*	**6627A**	Performance	71
20	2.5	50	1	*	**E3642A**	Basic	22
20	2.5	50	2	*	**E3648A**	Basic	23

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DC Power Supply Selection Index (Continued)

Maximum volts	Maximum amps	Maximum watts	Number of outputs	GPIB	Model number	Type	Page number
20	2.5	50	up to 4	*	**N6733B**	Basic	84, 92
20	3	60	1		**E3615A**	Basic	17
20	4	80	2	*	**6621A**	Performance	71
20	4	80	2	*	**6622A**	Performance	71
20	4	80	3	*	**6623A**	Performance	71
20	4	80	1	*	**E3644A**	Basic	22
20	5	100	1	*	**6632B**	Performance	40
20	5	100	up to 4	*	**N6743B**	Basic	86, 92
20	7.5	150	up to 8	*	**66102A**	Performance	88
20	10	200	1	*	**6033A**	Autoranging	24
20	10	200	1	*	**6038A**	Autoranging	24
20	10	200	1		**6542A**	Performance	45
20	10	200	1	*	**6642A**	Performance	42
20	10	200	1	*	**E3633A**	Basic	20
20	15	300	1	*	**6651A-J09**	Performance	49
20	15	300	up to 4	*	**N6773A**	Basic	82, 92
20	25	500	1		**6552A**	Performance	52
20	25	500	1	*	**6652A**	Performance	48
20	38	760	1	*	**N5744A**	Basic	27
20	50	300	up to 2	*	**N6753A**	Performance	75, 92
20	50	300	up to 2	*	**N6763A**	Performance	78, 93
20	50	500	up to 2	*	**N6755A**	Performance	75, 92
20	50	500	up to 2	*	**N6765A**	Performance	78, 93
20	50	1000	1	*	**6031A**	Autoranging	24
20	50	1000	1	*	**6032A**	Autoranging	24
20	76	1520	1	*	**N5764A**	Basic	30
20	100	2000	1		**6572A**	Performance	63
20	100	2000	1	*	**6672A**	Performance	56
20	165	3300	1	*	**N8734A**	Basic	32
20	250	5000	1	*	**N8754A**	Basic	35
21	240	5000	1	*	**6682A**	Performance	67
24	6	100	up to 8	*	**66103A-J12**	Performance	90
24	85	2000	1	*	**6672A-J04**	Performance	57
25	1	25	2		**E3620A**	Basic	18
25	1	25	3	*	**E3631A**	Basic	19
25	7	175	1	*	**E3634A**	Basic	20
27	20	540	1	*	**6652A-J03**	Performance	49
28	5	140	up to 8	*	**66103A-J09**	Performance	90
30	3	90	1		**U8001A**	Basic	14
30	4	120	1	*	**E3632A**	Basic	20
30	5	150	1		**U8002A**	Basic	14
30	17.5	500	1	*	**6653A-J17**	Performance	49
30	17.5	525	1		**6553A-J17**	Performance	53
30	25	750	1	*	**N5745A**	Basic	27
30	50	1500	1	*	**N5765A**	Basic	30

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DC Power Supply Selection Index (Continued)

Maximum volts	Maximum amps	Maximum watts	Number of outputs	GPIB	Model number	Type	Page number
30	110	3300	1	*	**N8735A**	Basic	32
30	170	5100	1	*	**N8755A**	Basic	35
30	220	6600	1	*	**6691A**	Performance	69
32	160	5100	1	*	**6683A**	Performance	67
35	0.8	28	1	*	**E3641A**	Basic	22
35	0.8	28	2	*	**E3647A**	Basic	23
35	0.85	30	1		**E3611A**	Basic	16
35	1.25	40	up to 8	*	**66105A-J01**	Performance	90
35	1.4	49	1	*	**E3643A**	Basic	22
35	1.4	49	2	*	**E3649A**	Basic	23
35	1.5	50	up to 4	*	**N6734B**	Basic	84, 92
35	1.7	60	1		**E3616A**	Basic	17
35	2.2	80	1	*	**E3645A**	Basic	23
35	3	80	3	*	**6623A-J03**	Performance	71
35	3	100	up to 4	*	**N6744B**	Basic	86, 92
35	4.5	150	up to 8	*	**66103A**	Performance	88
35	6	210	1		**6543A**	Performance	45
35	6	210	1	*	**6643A**	Performance	42
35	8.5	300	up to 4	*	**N6774A**	Basic	82, 92
35	15	525	1		**6553A**	Performance	52
35	15	525	1	*	**6653A**	Performance	48
35	60	2100	1		**6573A**	Performance	63
35	60	2100	1	*	**6673A**	Performance	56
37	4	150	up to 8	*	**66103A-J01**	Performance	89
37.5	45	1690	1		**6573A-J03**	Performance	64
37.5	45	1690	1	*	**6673A-J03**	Performance	57
40	3.6	100	up to 8	*	**66103A-J02**	Performance	89
40	5	200	1	*	**6643A-J11**	Performance	43
40	12.5	500	1		**6553A-J04**	Performance	53
40	12.5	500	1	*	**6653A-J04**	Performance	49
40	19	760	1	*	**N5746A**	Basic	27
40	38	1520	1	*	**N5766A**	Basic	30
40	50	2000	1		**6573A-J08**	Performance	64
40	50	2000	1	*	**6673A-J08**	Performance	58
40	85	3400	1	*	**N8736A**	Basic	32
40	125	5000	1	*	**N8756A**	Basic	35
40	128	5100	1	*	**6684A**	Performance	67
50	0.5	25	2	*	**6625A**	Performance	73
50	0.5	25	4	*	**6626A**	Performance	73
50	0.8	40	3	*	**6623A**	Performance	71
50	0.8	40	4	*	**6624A**	Performance	71
50	0.8	40	4	*	**6627A**	Performance	71
50	1	50	1	*	**6613C**	Performance	38
50	1	50	2	*	**6625A**	Performance	73
50	1	50	4	*	**6626A**	Performance	73

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DC Power Supply Selection Index (Continued)

Maximum volts	Maximum amps	Maximum watts	Number of outputs	GPIB	Model number	Type	Page number
50	1	50	2	*	**6628A**	Performance	73
50	1	50	4	*	**6629A**	Performance	73
50	1.5	50	up to 4	*	**N6761A**	Performance	78, 93
50	2	80	2	*	**6622A**	Performance	71
50	2	100	1	*	**6633B**	Performance	40
50	3	100	up to 4	*	**N6762A**	Performance	78, 93
50	4	200	1	*	**E3634A**	Basic	20
50	5	50	up to 4	*	**N6751A**	Performance	75, 92
50	10	100	up to 4	*	**N6752A**	Performance	75, 92
50	10	500	1		**6554A-J05**	Performance	54
50	10	500	1	*	**6654A-J05**	Performance	50
50	42	2000	1		**6574A-J07**	Performance	64
50	42	2000	1	*	**6674A-J07**	Performance	58
55	3	165	1	*	**66104A-J09**	Performance	90
56	38	2000	1		**6574A-J03**	Performance	64
56	38	2000	1	*	**6674A-J03**	Performance	58
60	0.5	30	1		**E3612A**	Basic	16
60	0.5	30	1	*	**E3641A**	Basic	22
60	0.5	30	2	*	**E3647A**	Basic	23
60	0.8	48	1	*	**E3643A**	Basic	22
60	0.8	48	2	*	**E3649A**	Basic	23
60	0.8	50	up to 4	*	**N6735B**	Basic	84, 92
60	1	60	1		**E3617A**	Basic	17
60	1.3	80	1	*	**E3645A**	Basic	23
60	1.6	100	up to 4	*	**N6745B**	Basic	86, 92
60	2.5	150	up to 8	*	**66104A**	Performance	88
60	3.3	200	1	*	**6038A**	Autoranging	24
60	3.5	210	1		**6544A**	Performance	45
60	3.5	210	1	*	**6644A**	Performance	42
60	5	300	up to 4	*	**N6775A**	Basic	82, 92
60	9	540	1		**6554A**	Performance	52
60	9	540	1	*	**6654A**	Performance	48
60	12.5	750	1	*	**N5747A**	Basic	29
60	17	500	up to 2	*	**N6756A**	Performance	75, 92
60	17	500	up to 2	*	**N6766A**	Performance	78, 93
60	17	1200	1	*	**6030A**	Autoranging	24
60	17.5	1200	1	*	**6032A**	Autoranging	24
60	20	300	up to 2	*	**N6754A**	Performance	75, 92
60	20	300	up to 2	*	**N6764A**	Performance	78, 93
60	25	1500	1	*	**N5767A**	Basic	31
60	35	2100	1		**6574A**	Performance	63
60	35	2100	1	*	**6674A**	Performance	56
60	55	3300	1	*	**N8737A**	Basic	34
60	85	5100	1	*	**N8757A**	Basic	35
60	110	6600	1	*	**6692A**	Performance	69

More detailed specifications at **www.agilent.com/find/power**

DC Power Supply Selection Index (Continued)

Maximum volts	Maximum amps	Maximum watts	Number of outputs	GPIB	Model number	Type	Page number
70	3	200	1		**6544A-J09**	Performance	46
70	3	200	1	*	**6644A-J09**	Performance	43
70	7.5	500	1		**6554A-J04**	Performance	54
70	7.5	500	1	*	**6654A-J04**	Performance	50
80	6	480	1		**6554A-J12**	Performance	54
80	6	500	1	*	**6654A-J12**	Performance	50
80	9.5	760	1	*	**N5748A**	Basic	29
80	19	1520	1	*	**N5768A**	Basic	31
80	42	3360	1	*	**N8738A**	Basic	34
80	65	5200	1	*	**N8758A**	Basic	35
100	0.5	50	1	*	**6614C**	Performance	38
100	0.5	50	up to 4	*	**N6736B**	Basic	84, 92
100	1	100	1	*	**6634B**	Performance	40
100	1	100	up to 4	*	**N6746B**	Basic	86, 92
100	3	300	up to 4	*	**N6776A**	Basic	82, 92
100	7.5	750	1	*	**N5749A**	Basic	29
100	15	1500	1	*	**N5769A**	Basic	31
100	22	2000	1	*	**6675A-J08**	Performance	59
100	33	3300	1	*	**N8739A**	Basic	34
100	50	5000	1	*	**N8759A**	Basic	36
110	20	2000	1		**6575A-J09**	Performance	65
110	20	2000	1	*	**6675A-J09**	Performance	59
120	0.25	30	1		**E3612A**	Basic	16
120	1.25	150	up to 8	*	**66105A**	Performance	88
120	1.5	180	1		**6545A**	Performance	45
120	1.5	180	1	*	**6645A**	Performance	42
120	4	540	1	*	**6655A**	Performance	48
120	4.5	540	1		**6555A**	Performance	52
120	18	2160	1		**6575A**	Performance	63
120	18	2160	1	*	**6675A**	Performance	56
135	16	2000	1		**6575A-J06**	Performance	65
135	16	2000	1	*	**6675A-J06**	Performance	58
150	2	300	up to 4	*	**N6777A**	Basic	82, 92
150	1.2	150	1		**6545A-J05**	Performance	46
150	1.2	150	1	*	**6645A-J05**	Performance	43
150	3.2	500	1	*	**6655A-J05**	Performance	50
150	5	750	1	*	**N5750A**	Basic	29
150	10	1500	1	*	**N5770A**	Basic	31
150	15	2000	1	*	**6675A-J11**	Performance	59
150	15	2250	1		**6575A-J11**	Performance	65
150	22	3300	1	*	**N8740A**	Basic	34
150	34	5100	1	*	**N8760A**	Basic	36
156	3	500	1		**6555A-J10**	Performance	54
156	3	500	1	*	**6655A-J10**	Performance	50

More detailed specifications at **www.agilent.com/find/power**

DC Power Supply Selection Index (Continued)

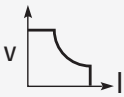
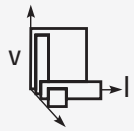
Maximum volts	Maximum amps	Maximum watts	Number of outputs	GPIB	Model number	Type	Page number
160	13	2000	1		**6575A-J04**	Performance	65
160	13	2000	1	*	**6675A-J04**	Performance	58
170	1	170	1	*	**6645A-J06**	Performance	43
200	0.75	150	up to 8	*	**66106A**	Performance	88
200	5	1000	1	*	**6035A**	Autoranging	24
200	5	1200	1	*	**6030A**	Autoranging	24
200	11	2000	1		**6575A-J07**	Performance	65
200	11	2000	1	*	**6675A-J07**	Performance	59
300	2.5	750	1	*	**N5751A**	Basic	29
300	5	1500	1	*	**N5771A**	Basic	31
300	11	3300	1	*	**N8741A**	Basic	34
300	17	5100	1	*	**N8761A**	Basic	36
500	2	1000	1	*	**6035A**	Autoranging	24
600	1.3	780	1	*	**N5752A**	Basic	29
600	2.6	1560	1	*	**N5772A**	Basic	31
600	5.5	3300	1	*	**N8742A**	Basic	34
600	8.5	5100	1	*	**N8762A**	Basic	36
70/80	30/26	2000	1	*	**E4356A**	Telecom	61

DC Power Supply
Feature Description Index

		6030 Series Autorangers	6610 & 6630 Series Single-Output	6620 Series Multiple-Output	6620 Series Precision Multiple-Output	6640 & 6650 Series Single-Output	6670-6690 Series Single-Output	66000 Modular Power Systems	E3630 & E3640 Series Single & Multiple-Output	N5700 & N8700 Series Single-Output	N6700 Modular Power System Family
DC range	**Max power**	200 W-1000 W	40 W-100 W	40 W & 80 W	25 W & 50 W	200 W-500 W	2000 W-6600 W	1200 W	30 W-200 W	700 W-5000 W	50 W-500 W
	Max voltage	500 V	100 V	50 V	50 V	120 V	120 V	200 V	60 V	600 V	150 V
	Max current	120 A	10 A	10 A	2 A	50 A	875 A	16 A	20 A	400 A	50 A
	Page	24	38, 40	71	73	42, 48	56, 67, 69	88	20, 22	27, 32	75
Configuration Features											
"One-box" solution To preserve rack space and interconnections, the voltage and current programmers, current shunt, and DVM are built-in to one package.		•	•	•	•	•	•	•	•	•	•
Modular power system (multiple reconfigurable outputs) Modules can be installed into a mainframe, and configuration can be changed at any time.								• Up to 8			• Up to 4
Multiple non-reconfigurable outputs Up to four outputs are included in one package, and they share one GPIB address.				•	•				•		
Serial link Up to 16 power supply outputs can share one GPIB address when connected with a telephone style cable.		•				•	•	•			
Relay connect, disconnect, & polarity reversal Optionally integrated with the power supply								•	•		• Module dependent
Auto-parallel, auto-series, parallel, and series operation When connected in auto-parallel or auto-series, only one unit has to be programmed to take advantage of the full power from all. **AP**=auto-parallel **AS**=auto-series **S**=series **P**=parallel		S AP		S P up to 2 identical outputs	S P up to 2 identical outputs	S AP	S AP	S, P	S, P	•	•
Analog programming and monitoring ports Analog programming ports allow the power supply to be used as a power amplifier, responding to an external voltage signal. Monitoring ports allow an external DMM to monitor the power-supply outputs.		•				•	•			•	

For more detailed specifications see the product manual at **www.agilent.com/find/power**

DC Power Supply Feature Description Index
(Continued)

		6030 Series Autorangers	6610 & 6630 Series Single-Output	6620 Series Multiple-Output	6620 Series Precision Multiple-Output	6640 & 6650 Series Single-Output	6670-6690 Series Single-Output	66000 Modular Power Systems	E3630 & E3640 Series Single & Multiple-Output	N5700 & N8700 Series Single-Output	N6700 Modular Power System Family
DC range	**Max power**	200 W-1000 W	40 W-100 W	40 W & 80 W	25 W & 50 W	200 W-500 W	2000 W-6600 W	1200 W	30 W-200 W	700 W-5000 W	50 W-500 W
	Max voltage	500 V	100 V	50 V	50 V	120 V	120 V	200 V	60 V	600 V	150 V
	Max current	120 A	10 A	10 A	2 A	50 A	875 A	16 A	20 A	400 A	50 A
	Page	24	38, 40	71	73	42, 48	56, 67, 69	88	20, 22	27, 32	75
Output Voltage and Current Range Changing											
Single range The output voltage is limited by a single maximum value. The output current is limited by a single maximum value.			•			•	•	•		•	• N6730 N6740 N6770
Auto-ranging A wide, continuous range of voltage and current combinations are available automatically at the maximum power level. 		•									• N6750 N6760
Multiple-output range changing Automatic range changing gives maximum power to two different voltage and current combinations.				•	•				•		• N6760
Precision multiple-output range changing Voltage and current ranges can be chosen independently to provide greater resolution. 					•						• N6760
Performance Characteristics											
Output ripple and noise (Peak-to-peak, 20 Hz to 20 MHz)		30-160 mV	3 mV (10 mV to 25 mV in fast mode)	3 mV	3 mV	3 mV-7 mV	7 mV-25 mV	5-50 mV	2-5 mV	60-500 mV	**
Output programming response time Rise and fall time with full resistive load (10 to 90% and 90 to 10%) Does not include command processing time.		200 W: (100 ms-200 ms) 1000 W: (300 ms-2000 ms)	2 ms (0.4 ms in fast mode)	2-6 ms	6 ms	15 ms	9 ms-195 ms	20 ms-50 ms	11 ms-95 ms	0.08 s to 0.50 s	*
Programming resolution (percent of full scale)		0.025%	0.025%	0.03%	0.007%	0.025%	0.025%	0.03%	0.025%/0.007%	*	*

* See datasheet or user's guide for complete details

** N6750/N6760: 4.5 mVpp to 6 mVpp, N6770: 20 mVpp to 68 mVpp, N6730/N6740: 10 mVpp to 30 mVpp

For more detailed specifications see the product manual at **www.agilent.com/find/power**

DC Power Supply Feature Description Index
(Continued)

		6030 Series Autorangers	6610 & 6630 Series Single-Output	6620 Series Multiple-Output	6620 Series Precision Multiple-Output	6640 & 6650 Series Single-Output	6670-6690 Series Single-Output	66000 Modular Power Systems	E3630 & E3640 Series Single & Multiple-Output	N5700 & N8700 Series Single-Output	N6700 Modular Power System Family
DC range	**Max power**	200 W-1000 W	40 W-100 W	40 W & 80 W	25 W & 50 W	200 W-500 W	2000 W-6600 W	1200 W	30 W-200 W	700 W-5000 W	50 W-500 W
	Max voltage	500 V	100 V	50 V	50 V	120 V	120 V	200 V	60 V	600 V	150 V
	Max current	120 A	10 A	10 A	2 A	50 A	875 A	16 A	20 A	400 A	50 A
	Page	24	38, 40	71	73	42, 48	56, 67, 69	88	20, 22	27, 32	75
GPIB Programming Features											
GPIB programming of voltage and current Self-documenting programming commands mean that programming is done in units of volts and amps, not in percentages or binary representations.		•	•	•	•	•	•	•	•	• GPIB LAN USB	• GPIB LAN USB
Measured voltage and current read-back over the GPIB The output is read back in units of volts and amps.		•	•	•	•	•	•	•	•	•	•
Store-recall states Complete operating states can be stored in nonvolatile memory. Each state specifies not only the output voltage and current, but also many of the programmable protection features.											
	Number nonvolatile states (One of these states is automatically accessed on turn-on)	0	4	0	4	5	6670-5 6680-4 6690-4	5	E363x-3 E364x-5	1	2
	Number volatile states	16/5	0	10	7	0	0	5	0	16	0
Standard Commands for Programmable Instruments (SCPI) SCPI is the standard language for test and measurement equipment. Standard codes make a software writing and maintenance more efficient. For example, using this standard, the output voltage of the power supply is measured with the same command (MEASURE: VOLTAGE?) by either a DMM or a power supply.		•	•			•	•	•	•	•	•
Protection Features											
GPIB programmable overvoltage protection Can be enabled to quickly down-program the output and set SRQ and/or DFI/RI. **T** = Can generate trigger. **M** = Overvoltage, the level is set manually with a front-panel control.		M	•	T	T	•	•	T	•	T M	T
GPIB programmable overcurrent protection Can be enabled to quickly down-program the output and set SRQ and/or DFI/RI. **T** = Can generate trigger.		•	•	•	•	•	•	T	E3632A E3633A E3634A	T	T
Overtemperature protection Will down-program the output and can be enabled to set SRQ and/or DFI. **T** = Can generate trigger.		•	•	•	•	•	•	T		T	T

For more detailed specifications see the product manual at **www.agilent.com/find/power**

DC Power Supply Feature Description Index
(Continued)

DC range		6030 Series Autorangers	6610 & 6630 Series Single-Output	6620 Series Multiple-Output	6620 Series Precision Multiple-Output	6640 & 6650 Series Single-Output	6670-6690 Series Single-Output	66000 Modular Power Systems	E3630 & E3640 Series Single & Multiple-Output	N5700 & N8700 Series Single-Output	N6700 Modular Power System Family
	Max power	200 W-1000 W	40 W-100 W	40 W & 80 W	25 W & 50 W	200 W-500 W	2000 W-6600 W	1200 W	30 W-200 W	700 W-5000 W	50 W-500 W
	Max voltage	500 V	100 V	50 V	50 V	120 V	120 V	200 V	60 V	600 V	150 V
	Max current	120 A	10 A	10 A	2 A	50 A	875 A	16 A	20 A	400 A	50 A
	Page	24	38, 40	71	73	42, 48	56, 67, 69	88	20, 22	27, 32	75
Protection Features (Continued)											
Discrete fault indicator/ remote inhibit (DFI/RI) Using these digital ports, power supplies can be connected independently of the GPIB. If any one experiences an error condition (overvoltage, for example), it can signal the other units to also downprogram their outputs. **O** = Optional		•	•	O	O	•	•	•		•	•
SRQ Almost any fault condition or change of state of the power supply can be enabled to generate an SRQ. This signals the computer to take the appropriate action.		•	•	•	•	•	•	•		•	•
Local lockout Front-panel or keyboard control can be disabled. This keeps unauthorized operators from changing the programmed states.		•	•	•	•	•	•	•	•	•	•
Fan-speed control Controls the fan-speed to provide only the required cooling, reducing unnecessary acoustic noise. **O** = Optional			•			•	•	•		•	•
Active down-programming Active circuits quickly drain the energy from the output when unit is programmed to a lower voltage. This means that a unit under test can be safely removed from its test fixture without danger of arcing. **F** = Full-rated output current **P** = Less than 100% rated output current		P	6610-P 6630-F	F	F	P	P	P			P N6750 N6760 Only
Maintenance Features											
Electronic calibration in the rack Calibration requires no internal adjustments.			•	•	•	•	•	•	•	•	•
Calibration security Units can be protected from accidental access to calibration routines by either a password (P) or an internal jumper (J) or switch (s).			P, S	J	J	P, J	P, J	P, S	P, J	* P	* P
Self-test Extensive self-test is triggered automatically on power-up. Additional tests can be initialed by user programming or front-panel control.		•	•	•	•	•	•	•	•	•	•

*A nonvolatile status in SCPI mode only.

For more detailed specifications see the product manual at **www.agilent.com/find/power**

Basic DC Power Supplies...

essential features for a tight budget

Agilent basic DC power supplies are the right choice for many applications. They provide quiet, stable DC power for both manual and automatic testing, in R&D and in manufacturing environments, where speed and accuracy are low considerations. At their price level, they have a surprising level of capability.

If you do not need the performance level and features of Agilent high performance DC power supplies, then choose Agilent basic DC power supplies. This summary table will help you decide which family of DC power supplies best meets your needs.

Comparison Summary	Agilent basic DC power supplies	Agilent high performance DC power supplies
Output power	30 W-1500 W	40 W-6600 W
Number of outputs	1-3	1-8
GPIB programming and measurement speed	Moderate	Fast
Output rise/fall time	Moderate	Fast
Convenient 1/2-rack size for bench-top use	Yes	No
Active downprogrammer for enhanced test throughput	No	Yes
Stored wake-up state	No	Yes
Programmable capabilities	Moderate	Extensive
Protection for the DUT	Moderate	Extensive

More detailed specifications at **www.agilent.com/find/power**

U8001A-U8002A

Single-Output
90-150 W

90 W to 150 W outputs, up to 30 V and 5 A
Single output models in half rack width size
Low noise, linear regulation
Single range output provides more current at lower voltage settings

More protection, more convenience — for less

It's often difficult to find a power supply that is just right for your test requirements and your budget. Whether you're manufacturing consumer products, testing electronic components, or simply looking for reliable, affordable power, Agilent's family of basic power supplies now includes single output, non-programmable models in the 90 W to 150 W power range. With capabilities typically found only in programmable supplies, you get excellent value along with great efficiency in your work. As a result, you can minimize setup time and measurement errors and maximize device reliability. You'll get the right power with a difference — backed by stringent safety certifications and Agilent quality standards — at an affordable price.

The Agilent U8000 Series offers 90 W to 150 W single output, non-programmable DC power supplies that include features typically found only in costly programmable supplies. The U8000 Series delivers excellent value by providing reliable DC power, efficient setup capabilties, and important security features that let you address a variety of applications in electronics manufacturing and educational settings.

Specifications (at 0° to 40°C unless otherwise specified)	**U8001A**	**U8002A**
Output ratings (at 0°C to 40°C)	0 to +30 V 0 to 3 A	0 to +30 V 0 to 5 A
Line and load regulation	CV: <0.01% +2 mV CC: <0.02% +2 mA	CV: <0.01% +2 mV CC: <0.02% +2 mA
Ripple and noise (25°C ±5°C)	CV: 12 mVp-p, <1 mVrms; CC: 3 mArms	CV: 12 mVp-p, <1 mVrms; CC: 3 mArms
Load transient response time (within 15 mV from full load to half load and from half load to full load)	<50 µs	<50 µs
Programming accuracy[1] (25°C ±5°C)	<0.35% +20 mV <0.35% +20 mA	<0.35% +20 mV <0.35% +20 mA
Readback accuracy[1] (25°C ±5°C)	<0.35% +20 mV <0.35% +20 mA	<0.35% +20 mV <0.35% +20 mA
Meter resolution	Voltage: 10 mV Current: 10 mA	Voltage: 10 mV Current: 10 mA
Maximum output float voltage	±240 VDC	±240 VDC
Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)		
Temperature coefficient (for 12 months)	CV: <100 ppm/ °C CC: <380 ppm/ °C	CV: <100 ppm/ °C CC: <380 ppm/ °C
Output voltage overshoot (during turn-on or turn-off of AC power state with the output control set to less than 1 V)	<1 V	<1 V
Voltage programming speed, to within 1% of total excursion		
Up full load No load	150 ms 100 ms	150 ms 100 ms
Down full load No load	30 ms 450 ms	30 ms 450 ms
Last memory setting enabled	Yes	Yes
Overvoltage protection response time	<1.5 ms when the trip voltage is equal to or greater than 3 V and <10 ms when the trip voltage is less than 3 V (average time for output to drop from 90% of output voltage to 1 V after OVP condition occurred)	

More detailed specifications at **www.agilent.com/find/lowcostpower**

Single-Output: 90-150 W (Continued)

Power that's suitable for your application requirements

The U8000 Series with power ranging from 90 W to 150 W provides performance that is suitable for electronics manufacturing for computers and peripherals, communication systems and peripherals, aircraft/avionics systems, electronic components, and more. The U8000 Series complements the Agilent E3600 DC power supplies family to provide a wider range of power source alternatives.

Differentiated features typically found only in programmable power supplies

The U8000 Series offers fully integrated over voltage protection (OVP) and over current protection (OCP) to prevent damage to the device-under-test (DUT). Using the capability to save and recall three memory states, you can minimize errors and reduce set-up time. The U8000 Series also provides security features such as keypad lock to prevent measurement errors due to accidental front panel usage. When the keypad lock is activated, the knob and all the buttons on the front panel are disabled except the keypad lock button. The physical lock mechanism found at the rear panel of the power supply provides secure instrument storage. The LCD display with backlight on/off options enables brighter display for data viewing.

Solid, reliable performance in its class

The U8000 Series provides excellent load and line regulation (Constant Voltage, CV: < 0.01% +2 mV; Constant Current, CC: < 0.02% +2 mA) to ensure stable output even when the load changes. With the fast 50 µsec transient response, test times and manufacturing cost are significantly reduced. The U8000 Series comes with low output noise of 1 mVrms, 3 mArms from 20 Hz to 20 MHz, providing clean output and minimizing the interference in the DUT.

Supplemental characteristics for all model numbers

Size: U8001A-U8002A:
212.3 mm W x 88.1 mm H x 394.3 mm D
(8.4 in x 3.5 in x 15.5 in);

Weight:
U8001A: 7.3 kg (16.1 lbs)
U8002A: 8.3 kg (18.3 lbs)

Warranty: One year

Ordering information

Opt 0E9: 90 to 110 Vac, 47 to 63 Hz
Opt 0EM: 104 to 126 Vac, 47 to 63 Hz
Opt 0E3: 207 to 253 Vac, 47 to 63 Hz
Opt UK6: Commercial calibration with test result data
Opt 1CM: Rack mount kit

More detailed specifications at **www.agilent.com/find/lowcostpower**

E3610A-E3617A

Single-Output
30-60 W

Small, compact size for bench use
Low-noise and excellent regulation
Dual-range outputs (E3610A/11A/12A)
Overvoltage protection to ensure DUT safety

These linear-regulated DC power supplies provide reliable and convenient DC power on a lab bench. The 10-turn pots and clear voltage and current meters allow fine adjustments to be made easily. These models are CV/CC, so they can serve as either voltage or current sources. The "CC Set" button allows the current setting to be viewed, allowing easy adjustment of a current limit. Either the positive or negative terminal may be connected to ground, creating a positive or negative voltage, or floated up to 240 V from ground.

E3610A, E3611A, E3612A
These flexible 30 watt DC power supplies have 2 ranges, providing more current at lower voltage levels.

E3614A, E3615A, E3616A, E3617A
These DC power supplies provide remote sensing to eliminate the errors in voltage regulation due to voltage drops in the load leads. Delicate loads are protected by the overvoltage protection feature. Remote voltage signals can be used to control the power supply's output voltage and current levels.

Specifications (at 0° to 55°C unless otherwise specified)		**E3610A** ☎	**E3611A** ☎	**E3612A** ☎	**E3614A** ☎
Number of output ranges		2	2	2	1
GPIB		No	No	No	No
Output ratings[1]					
Range 1		0 to 8 V, 0 to 3 A[1]	0 to 20 V, 0 to 1.5 A[1]	0 to 60 V, 0 to 0.5 A[1]	0 to 8 V, 0 to 6 A
Range 2		0 to 15 V, 0 to 2 A[1]	0 to 35 V, 0 to 0.85 A[1]	0 to 120 V, 0 to 0.25 A[1]	—
Power (max)		30 W	30 W	30 W	48 W
Load and line regulation		0.01% + 2 mV	0.01% + 2 mV	0.01% + 2 mV	0.01% + 2 mV
Ripple and noise from 20 Hz to 20 MHz					
Voltage rms		200 µV	200 µV	200 µV	200 µV
peak-peak		2 mV	2 mV	2 mV	1 mV
Supplemental Characteristics		(Non-warranted characteristics determined by design that are useful in applying the product)			
Control mode		CV/CC	CV/CC	CV/CC	CV/CC
Meter resolution	Voltage	10 mV	100 mV	100 mV	10 mV
(minimum change using front-panel controls)	Current	10 mA	10 mA	1 mA	10 mA

☎ For 0ff-the-shelf shipment
[1] Maximum current is derated 1% per °C between 40° to 55°C.

Application notes

Understanding Linear Power Supply Operation (AN1554)
5989-2291EN

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

More detailed specifications at **www.agilent.com/find/E3600**

Single-Output: 30-60 W (Continued)

Supplemental characteristics for all model numbers

Size: E3610A-E3612A: 91 mm H x 213 mm W x 319 mm D (3.6 in x 8.4 in x 12.6 in); E3614A-E3617A: 91 mm H x 213 mm W x 373 mm D (8.4 in x 3.6 in x 14.7 in)

Weight: E3610A-E3612A: 3.8 kg (8.4 lb) net, 5.1 kg (11.3 lb) shipping; E3614A-E3617A: 5.5 kg (12.1 lb) net, 6.75 kg (14.9 lb) shipping

Warranty: One year

Ordering information

Opt 0E9 90 to 110 VAC, 47 to 63 Hz (Japan only)
Opt 0EM 104 to 126 VAC, 47 to 63 Hz
Opt 0E3 207 to 253 VAC, 47 to 63 Hz
Opt 1CM Rack mount kit (E3614A-E3617A only)
Opt 0L2 Extra documentation package

Specifications (at 0° to 55°C unless otherwise specified)		**E3615A** ☎	**E3616A** ☎	**E3617A** ☎
Number of output ranges		1	1	1
GPIB		No	No	No
Output ratings[1]				
Range 1		0 to 20 V, 0 to 3 A	0 to 35 V, 0 to 1.7 A	0 to 60 V, 0 to 1 A
Range 2		—	—	—
Power (max)		60 W	60 W	60 W
Load and line regulation		0.01% + 2 mV	0.01% + 2 mV	0.01% + 2 mV
Ripple and noise from 20 Hz to 20 MHz				
Voltage rms		200 µV	200 µV	200 µV
peak-peak		1 mV	1 mV	1 mV
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)		
Control mode		CV/CC	CV/CC	CV/CC
Meter resolution	Voltage	10 mV (0-20 V), 100 mV (>20 V)	10 mV (0-20 V), 100 mV (>20 V)	10 mV (0-20 V), 100 mV (>20 V)
(minimum change using front-panel controls)	Current	10 mA	1 mA	1 mA

☎ For 0ff-the-shelf shipment
[1] Maximum current is derated 1% per °C between 40° to 55°C.

More detailed specifications at **www.agilent.com/find/E3600**

E3620A, E3630A

Multiple-Output
35 W and 50 W

Dual and triple outputs
Small, compact size for bench use
Low-noise and excellent regulation
Overload indicator to monitor output
Autotracking for outputs synchronization

These linear-regulated DC power supplies provide reliable and convenient DC power on a lab bench. Voltage and current can be monitored simultaneously on the front panel meters. There is also an overload indicator for each output.

E3620A
The E3620A has two isolated, independent, CV/CL 25 volt outputs. It is easy to make precise adjustments using the 10-turn pots.

E3630A
The E3630A triple output power supply has two 20 volt outputs and one 6 volt output. The +6 V output is an isolated constant-voltage/current-foldback output, and both the +20 volt output and the -20 volt output are constant-voltage/current-limit. An autotracking feature lets you use one voltage control to adjust both 20 volt outputs. These outputs track each other to within one percent, making it easy to adjust the power supply for circuits requiring balance voltages. The ±20 volt outputs are referenced together to a floating common.

Application notes

Understanding Linear Power Supply Operation (AN1554)
5989-2291EN

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

Specifications (at 0° to 55°C unless otherwise specified)	E3620A ☎	E3630A ☎
Number of outputs	2	3
GPIB	No	No
Output ratings*		
Output 1	0 to 25 V, 0 to 1 A	0 to 6 V, 0 to 2.5 A*
Output 2	0 to 25 V, 0 to 1 A	0 to +20 V, 0 to 0.5 A
Output 3	—	0 to -20 V, 0 to 0.5 A
Power (max)	50 W	35 W
Load regulation	0.01% + 2 mV	0.01% + 2 mV
Ripple and noise from 20 Hz to 20 MHz		
Normal mode voltage rms	350 µV	350 µV
peak-to-peak	1.5 mV	1.5 mV
Common mode current	1 µArms	1 µArms
Control mode	CV/CL	CV/CL (±20 V), CV/CF (6 V)
Meter resolution (Minimum change using front-panel controls)		
Voltage	10 mV (0-20 V), 100 mV, (>20 V)	10 mV
Current	1 mA	10 mA
Input power	115 Vac ± 10%, 47 to 63 Hz	115 Vac, ± 10%, 47 to 63 Hz

*Maximum current is derated 3.3% per °C from 40°C to 55°C
☎ For off-the-shelf shipment

Supplemental characteristics

Size: E3620A:
213 mm W x 91 mm H x 401 mm D
(8.4 in x 3.6 in x 15.8 in)
E3630A:
213 mm W x 92 mm H x 320 mm D
(8.4 in x 3.6 in x 12.6 in)

Weight: E3620A: 5.5 kg (12.1 lbs)
E3630A: 3.8 kg (8.4 lbs)

Warranty: One year

Ordering information

Opt 0E9 90 to 110 VAC, 47 to 63 Hz (Japan only)
Opt 0EM 104 to 126 VAC, 47 to 63 Hz
Opt 0E3 207 to 253 VAC, 47 to 63 Hz
Opt 1CM rack mount kit
Opt 0L2 extra documentation package

More detailed specifications at **www.agilent.com/find/E3600**

E3631A

Triple-Output
80 W GPIB

- Small, compact size for bench use
- Low output ripple and noise
- Built-in measurements and basic programmable features
- Over-voltage protection to ensure DUT safety
- Three memory states to ease test setup

This is the DC power supply for every engineer's or electronic technician's lab bench. It has two tracking 25 V outputs, which are together referenced to a floating common, and an isolated 6 volt output. It is easy to control from the front panel, or with industry standard SCPI commands via the GPIB or RS232. VXI*Plug&Play* drivers are available to further simplify computer control. Up to 3 complete states can be stored for later recall. The low noise, excellent regulation, and built-in voltmeter/ammeter make this reliable power supply well suited for the needs of the R&D lab.

Application notes

Understanding Linear Power Supply Operation (AN1554)
5989-2291EN

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

Supplemental characteristics for all model numbers

Product regulation: Designed to comply with UL1244, IEC 1010-1; certified with CSA 22.2
Meets requirements for CE regulation

Software driver:
- IVI-COM
- VXI*Plug&Play*
- IntuiLink Connectivity Software

Specifications
(at 0° to 55°C unless otherwise specified)

	E3631A		
DC outputs			
Voltage	0 to +25 V	0 to -25 V	0 to 6 V
Current	0 to 1 A	0 to 1 A	0 to 5 A
Load regulation			
Voltage	<0.01% + 2 mV	<0.01% + 2 mV	<0.01% + 2 mV
Current	<0.01% + 250 µA	<0.01% + 250 µA	<0.01% + 250 µA
Line regulation			
Voltage	<0.01% + 2 mV	<0.01% + 2 mV	<0.01% + 2 mV
Current	<0.01% + 250 µA	<0.01% + 250 µA	<0.01% + 250 µA
Ripple and noise from 20 Hz to 20 MHz			
Normal-mode voltage	<350 µVrms/2 mVp-p	<350 µVrms/2 mVp-p	<350 µVrms/2 mVp-p
Normal-mode current	<500 µArms	<500 µArms	<2 mArms
Common-mode current	<1.5 µArms	<1.5 µArms	<1.5 µArms
Programming accuracy at 25°C ±5°C			
Voltage	0.05% + 20 mV	0.05% + 20 mV	0.1% + 5 mV
Current	0.15% + 4 mA	0.15% + 4 mA	0.2% + 10 mA
Readback accuracy at 25°C ±5°C			
Voltage	0.05% + 10 mV	0.05% + 10 mV	0.1% + 5 mV
Current	0.15% + 4 mA	0.15% + 4 mA	0.2% + 10 mA
Resolution			
Program/readback	1.5 mV, 0.1 mA	1.5 mV, 0.1 mA	0.5 mV, 0.5 mA
Meter	10 mV, 1 mA	10 mV, 1 mA	1 mV, 1 mA
Transient response	50 µs for output to recover to within 15 mV following a change in output current from full load to half load or vice versa		

☎ For off-the-shelf shipment

Size: E3631A:
213 mm W x 133 mm H x 348 mm D
(8.4 in. x 5.2 in. x 14.2 in.)

Weight: E3631A: 8.2 kg (18 lbs)

Warranty: One year

Ordering information

Opt 0E9 90 to 110 VAC, 47 to 63 Hz (Japan only)
Opt 0EM 104 to 126 VAC, 47 to 63 Hz
Opt 0E3 207 to 253 VAC, 47 to 63 Hz
Opt 1CM Rack mount kit
Opt 0L2 Extra documentation package

More detailed specifications at **www.agilent.com/find/E3600**

E3632A-E3634A

Single-Output
120 W to 200 W GPIB

- Dual range outputs
- Small, compact size for bench use
- Low output ripple and noise
- Built-in measurements and basic programmable features
- Protection features to ensure DUT safety

These dual range DC power supplies provide the stable, accurate, and reliable DC power that the R&D engineer needs. These models are CV/CC, so they can serve as either voltage or current sources. They can be used either for manual or automated testing where moderate speed and accuracy are required. VXI*Plug&Play* drivers further simplify computer control.

These DC power supplies have many features to help the R&D engineer to quickly and easily bias and monitor prototype circuitry. Remote sensing eliminates the errors in voltage regulation due to voltage drops in the load leads. Delicate prototypes are protected by overvoltage and overcurrent protection features. Up to 3 frequently used operating states may be stored for later recall. The output is isolated from chassis ground.

For applications where even higher accuracy is needed, or speed must be optimized, see the Agilent 6600 series of performance DC power supplies.

Specifications (at 0° to 55°C unless otherwise specified)	**E3632A** ☎	**E3633A** ☎	**E3634A** ☎
Number of outputs	1	1	1
GPIB	Yes	Yes	Yes
Output ratings			
Range 1	0 to 15 V, 7 A	0 to 8 V, 20 A	0 to 25 V, 7 A
Range 2	0 to 30 V, 4 A	0 to 20 V, 10 A	0 to 50 V, 4 A
Load regulation			
Voltage	<0.01% + 2 mV	<0.01% + 2 mV	<0.01% + 2 mV
Current	<0.01% + 250 µA	<0.01% + 250 µA	<0.01% + 250 µA
Line regulation			
Voltage	<0.01% + 2 mV	<0.01% + 2 mV	<0.01% + 2 mV
Current	<0.01% + 250 µA	<0.01% + 250 µA	<0.01% + 250 µA
Ripple and noise from 20 Hz to 20 MHz			
Normal-mode voltage	<350 µVrms/2 mVp-p	<350 µVrms/3 mVp-p	<500 µVrms/3 mVp-p
Normal-mode current	<2 mArms	<2 mArms	<2 mArms
Common-mode current	<1.5 µArms	<1.5 µArms	<1.5 µArms
Programming accuracy at 25°C ±5°C			
Voltage	0.05% + 10 mV	0.05% + 10 mV	0.05% + 10 mV
Current	0.2% +10 mA	0.2% +10 mA	0.2% +10 mA
Readback accuracy at 25°C ±5°C			
Voltage	0.05% + 5 mV	0.05% + 5 mV	0.05% + 5 mV
Current	0.15% + 5 mA	0.15% + 5 mA	0.15% + 5 mA
Resolution			
Program	1 mV, 0.5 mA	1 mV, 1 mA	3 mV, 0.5 mA
Readback	0.5 mV, 0.1 mA	0.5 mV, 1 mA	1.5 mV, 0.5 mA
Meter	1 mV, 1 mA	1 mV, 1 mA (<10 A/10 mA (≥10 A))	1 mV, 1 mA (<10 A/10 mA (≥10 A))
Transient response	50 µs for output to recover to within 15 mV following a change in output current from full load to half load or vice versa		

*Maximum current is derated 1% per °C from 40°C to 55°C %

☎ For off-the-shelf shipment

More detailed specifications at **www.agilent.com/find/E3600**

Single-Output: 120 W to 200 W (Continued)

Application notes

Understanding Linear Power Supply Operation (AN1554)
5989-2291EN

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

Modern Connectivity - Using USB and LAN I/O Converters
(AN 1475-1)
5989-0123EN

Supplemental characteristics for all model numbers

Product regulation: Designed to comply with UL1244, IEC 61010-1; certified with CSA 22.2
Meets requirements for CE regulation

Software driver:
- IVI-COM
- VXI*Plug&Play*
- IntuiLink Connectivity Software

Size: 213 mm W x 133 mm H x 348 mm D (8.4 in. x 5.2 in. x 13.7 in.)

Weight: 9.5 kg (21 lbs)

Warranty: One year

Ordering information

Opt 0E9 90 to 110 VAC, 47 to 63 Hz (Japan only)
Opt 0EM 104 to 126 VAC, 47 to 63 Hz
Opt 0E3 207 to 253 VAC, 47 to 63 Hz
Opt 1CM Rack mount kit
Opt 0L2 Extra documentation package

E3640A-E3649A

Single & Dual Output
30-100 W GPIB

- Dual range outputs
- Small, compact size for bench and system use
- Low output ripple and noise
- Built-in measurements and basic programmable features
- Over-voltage protection to ensure DUT safety

These isolated dual range DC power supplies provide the stable and reliable DC power that the manufacturing test system designer needs. These models offer constant-voltage/constant-current outputs, so they can serve as either voltage or current sources. They can be used either for manual or automated testing, and have VXI*Plug&Play* drivers to further simplify computer control.

The E3640A series DC power supplies can be quickly integrated into a test system. Both front and rear panel terminals are provided for easy wiring. Remote sensing eliminates the errors in voltage regulation due to voltage drops in the load leads. Delicate DUTs are protected by overvoltage protection. Up to 5 operating states can be stored for later recall.

The E3640A series DC power supplies are intended for manufacturing test systems where moderate speed and accuracy are required. For systems which require even higher accuracy for programming or measurement, or where test throughput must be optimized, consider the Agilent 6600A and N6700 series of performance DC power supplies.

Specifications (at 0° to 55°C unless otherwise specified)	**E3640A**	**E3641A**	**E3642A**	**E3643A**	**E3644A**
Number of outputs	1	1	1	1	1
GPIB	Yes	Yes	Yes	Yes	Yes
DC outputs					
Voltage Current	0 to 8 V 3 A	0 to 35 V 0.8 A	0 to 8 V 5 A	0 to 35 V 1.4 A	0 to 8 V 8 A
Voltage Current	0 to 20 V 1.5 A	0 to 60 V 0.5 A	0 to 20 V 2.5 A	0 to 60 V 0.8 A	0 to 20 V 4 A
Power (max)	30 W	30 W	50 W	50 W	80 W
Load and line regulation					
Voltage	<0.01% + 3 mV	<0.01% + 3 mV	<0.01% + 3 mV	<0.01% + 3 mV	<0.01% + 3 mV
Current	<0.01% + 250 µA	<0.01% + 250 µA	<0.01% + 250 µA	<0.01% + 250 µA	<0.01% + 250 µA
Ripple and noise from 20 Hz to 20 MHz					
Normal-mode voltage	<500 µVrms 5 mVp-p	<1 mVrms 8 mVp-p	<500 µVrms 5 mVp-p	<1 mVrms 8 mVp-p	<500 µVrms 5 mVp-p
Normal-mode current	<4.0 mArms	<4.0 mArms	<4.0 mArms	<4.0 mArms	<4.0 mArms
Common-mode current	<1.5 µArms	<1.5 µArms	<1.5 µArms	<1.5 µArms	<1.5 µArms
Programming accuracy at 25°C ±5°C					
Voltage <0.05% +	10 mV	10 mV	10 mV	10 mV	10 mV
Current <0.2% +	10 mA	10 mA	10 mA	10 mA	10 mA
Readback accuracy at 25°C ±5°C					
Voltage <0.05% +	5 mV	5 mV	5 mV	5 mV	5 mV
Current <0.15% +	5 mA	5 mA	5 mA	5 mA	5 mA
Program resolution					
Voltage	5 mV	5 mV	5 mV	5 mV	5 mV
Current	1 mA	1 mA	1 mA	1 mA	1 mA
Readback resolution					
Voltage	2 mV	2 mV	2 mV	2 mV	2 mV
Current	1 mA	1 mA	1 mA	1 mA	1 mA
Meter resolution					
Voltage	10 mV	10 mV	10 mV	10 mV	10 mV
Current	1 mA	1 mA	1 mA	1 mA	1 mA
Transient response	<50 µs for output to recover to within 15 mV following a change in output current from full load to half load or vice versa.				

*Maximum current is derated 1% per °C from 40°C to 55°C

More detailed specifications at **www.agilent.com/find/E3600**

Single & Dual Output: 30-100 W GPIB (Continued)

Application notes

Understanding Linear Power Supply Operation (AN1554)
5989-2291EN

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

Modern Connectivity - Using USB and LAN I/O Converters (AN 1475-1)
5989-0123EN

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC from chassis ground

Remote sensing: Up to 1 V can be dropped in each load lead. The drop in the load leads subtracts from the voltage available for the load.

Settling time: Less than 90 ms for the output voltage to change from 1% to 99% or vice versa following the receipt of VOLTage or APPLy command via direct GPIB or RS-232 interface.

Product regulation:
Designed to comply with UL3111-1; certified to CSA 22.2 No. 1010.1; conforms to IEC 1010-1; complies with EMC directive 89/336/EEC(Group1, Class A)

OVP accuracy: 0.5% + 0.5 V, activation time: ≥3 V, <1.5 ms, and <3 V, <10 ms

Isolation: ±240 VDC

Stability: Voltage <0.02% + 2 mV; Current <0.1% + 1 mA

Temperature coefficient: <0.01% + 3 mV, <0.02% + 3 mA change per °C over operating range 0-40 °C after 30 minute warm-up

Software driver:
- IVI-COM
- VXI*Plug&Play*
- IntuiLink Connectivity Software

Warranty: One year

Specifications (at 0° to 55°C unless otherwise specified)	**E3645A**	**E3646A**	**E3647A**	**E3648A**	**E3649A**
Number of outputs	1	2	2	2	2
GPIB	Yes	Yes	Yes	Yes	Yes
DC outputs					
Voltage Current	0 to 35 V 2.2 A	0 to 8 V 3 A	0 to 35 V 0.8 A	0 to 8 V 5 A	0 to 35 V 1.4 A
Voltage Current	0 to 60 V 1.3 A	0 to 20 V 1.5 A	0 to 60 V 0.5 A	0 to 20 V 2.5 A	0 to 60 V 0.8 A
Power (max)	80 W	60 W	60 W	100 W	100 W
Load and line regulation					
Voltage <0.01% +	3 mV	3 mV	3 mV	3 mV	3 mV
Current <0.01% +	250 µA	250 µA	250 µA	250 µA	250 µA
Ripple and noise from 20 Hz to 20 MHz					
Normal-mode voltage	<1 mVrms 8 mVp-p	<500 µVrms 5 mVp-p	<1 mVrms 8 mVp-p	<500 µVrms 5 mVp-p	<1 mVrms 8 mVp-p
Normal-mode current	<4.0 mArms	<4.0 mArms	<4.0 mArms	<4.0 mArms	<4.0 mArms
Common-mode current	<1.5 µArms	<1.5 µArms	<1.5 µArms	<1.5 µArms	<1.5 µArms
Programming accuracy at 25°C ±5°C					
Voltage <0.05% + (<0.1% + 25 mA for output 2)	10 mV	10 mV	10 mV	10 mV	10 mV
Current <0.2% +	10 mA	10 mA	10 mA	10 mA	10 mA
Readback accuracy at 25°C ±5°C					
Voltage <0.05% + (<0.1% + 25 mV for output 2)	5 mV	5 mV	5 mV	5 mV	5 mV
Current <0.15% + (<0.15% + 10 mA for output 2)	5 mA	5 mA	5 mA	5 mA	5 mA
Program resolution					
Voltage	5 mV	5 mV	5 mV	5 mV	5 mV
Current	1 mA	1 mA	1 mA	1 mA	1 mA
Readback resolution					
Voltage	2 mV	2 mV	2 mV	2 mV	2 mV
Current	1 mA	1 mA	1 mA	1 mA	1 mA
Meter resolution					
Voltage	10 mV	10 mV	10 mV	10 mV	10 mV
Current	1 mA	1 mA	1 mA	1 mA	1 mA
Transient response	<50 µs for output to recover to within 15 mV following a change in output current from full load to half load or vice versa.				

*Maximum current is derated 1% per °C from 40°C to 55°C

Size: E3640A-E3645A:
213 mm W x 88 mm H x 348 mm D
(8.4 in x 3.5 in x 13.7 in)
E3646A-E3649A:
213 mm W x 133 mm H x 348 mm D
(8.4 in. x 5.2 in. x 13.7 in.)

Weight: E3640A, E3641A: 5.3 kg (11.7 lbs)
E3642A, E3643A: 6.2 kg (13.7 lbs)
E3644A, E3645A: 6.7kg (14.7 lbs)
E3646A, E3647A: 7.4 kg (16.1 lbs)
E3648A, E3649A: 9.5 kg (20.3 lbs)

Ordering Information

Opt 0E3 207 to 253 VDC, 47 to 63 Hz
Opt 0E9 90 to 110 VDC, 47 to 63 Hz (Japan only)
Opt 0EM 104 to 126 VDC, 47 to 63 Hz
Opt 1CM Rack mount kit (E3640A-E3645A: p/n5063-9240; E3646A-E3649A: p/n 5063-9243)
Opt 0L2 Extra documentation package
Opt 0B0 Delete documentation

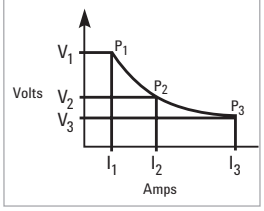
More detailed specifications at **www.agilent.com/find/E3600**

6030A, 6031A, 6032A, 6033A, 6035A, 6038A

Single-Output, Autoranging
200 W and 1000 W GPIB

- Autoranging outputs provide maximum power at a variety of operating voltages
- Analog/resistance control of output voltage and current
- Series and auto-parallel connections of multiple supplies
- Built-in measurements and advanced programmable features
- Protection features to ensure DUT safety

Autoranging Output:



This series of 200 watt and 1000 watt DC power supplies take the place of multiple power supplies in your test system by providing maximum power at a variety of operating points.

Industry standard SCPI commands and VXI*Plug&Play* drivers make system integration easy. Using the serial link, up to 16 power supplies can be connected through one GPIB address. These power supplies have excellent electrical efficiency, making them a good choice for large systems.

Application notes

10 Hints for Using Your Power Supply to Decrease Test Time
5968-6359E

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

Agilent DC Power Supplies for Base Station Testing
5988-2386EN

Specifications (at 0° to 55°C unless otherwise specified)		**6030A**	**6031A**	**6032A**	**6033A**	**6035A**	**6038A**
Number of outputs		1	1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes	Yes
Output ratings							
Output voltage		0 to 200 V	0 to 20 V	0 to 60 V	0 to 20 V	0 to 500 V	0 to 60 V
Output current		0 to 17 A	0 to 120 A	0 to 50 A	0 to 30 A	0 to 5 A	0 to 10 A
Maximum power watts		1,200 W	1,064 W	1,200 W	242 W	1,050 W	240 W
Auto-ranging output	V_1, I_1	200 V, 5 A	20 V, 50 A	60 V, 17.5 A	20 V, 10 A	500 V, 2 A	60 V, 3.3 A
	V_2, I_2	120 V, 10 A	14 V, 76 A	40 V, 30 A	14 V, 17.2 A	350 V, 3 A	40 V, 6 A
	V_3, I_3	60 V, 17 A	7 V, 120 A	20 V, 50 A	6.7 V, 30 A	200 V, 5 A	20 V, 10 A
Programming accuracy at 25°C ±5°C	Voltage	0.035% +145 mV	0.035% +15 mV	0.035% +40 mV	0.035% +9 mV	0.25% +400 mV	0.035% +40 mV
	Current	0.2% +25 mA	0.25% +250 mA	0.2% +85 mA	0.15% +20 mA	0.3% +63 mA	0.09% +10 mA
Ripple and noise 20 Hz to 20 MHz	Voltage rms	22 mV	8 mV	8 mV	3 mV	50 mV	3 mV
	p-p	50 mV	50 mV	40 mV	30 mV	160 mV	30 mV
	Current rms	15 mA	120 mA	25 mA	30 mA	50 mA	5 mA
Readback accuracy at 25°C ±5°C	Voltage	0.08% +80 mV	0.08% +7 mV	0.08% +20 mV	0.07% +6 mV	0.5% +200 mV	0.07% +50 mV
	Current	0.36% +15 mA	0.4% +100 mA	0.36% +35 mA	0.3% +25 mA	0.5% +50 mA	0.2% +11 mA
Load regulation							
Voltage	0.01%+	5 mV	3 mV	5 mV	2 mV	40 mV	3 mV
Current		0.01%+ 10 mA	0.01%+ 15 mA	0.01%+ 10 mA	0.01%+ 9 mA	0.03%+ 34 mA	0.01%+ 5 mA
Line regulation							
Voltage		0.01%+ 5 mV	0.01%+ 2 mV	0.01%+ 3 mV	0.01%+ 1 mV	0.03%+ 17 mV	0.01%+ 2 mV
Current		0.01%+ 5 mA	0.01%+ 25 mA	0.01%+ 10 mA	0.01%+ 6 mA	0.03%+ 17 mA	0.01%+ 2 mA
Transient response time 10% step change	Time	2 ms	2 ms	2 ms	1 ms	5 ms	1 ms
	Level	150 mV	100 mV	100 mV	50 mV	200 mV 7	5 mV

More detailed specifications at **www.agilent.com/find/6030**

Autoranging: 200 W and 1000 W GPIB (Continued)

Specifications (at 0° to 55°C unless otherwise specified)	6030A	6031A	6032A	6033A	6035A	6038A

Supplemental characteristics for all model numbers

Remote sensing: Up to 2 V drop in each lead. Voltage regulation specification met with up to 0.5 V drop, but degrades for greater drops.

Modulation: (analog programming of output voltage and current)
Input signal: 0 to 5 V or 0 to 4 kΩ

Software driver:
VXI*Plug&Play*

Size: 6030A–32A, 6035A:
425.5 mm W x 132.6 mm H x 503.7 mm D
(16.75 in x 5.25 in x 19.83 in).
6033A, 6038A:
212.3 mm W x 177.0 mm H x 516.4 mm D
(8.36 in x 6.97 in x 17.87 in).

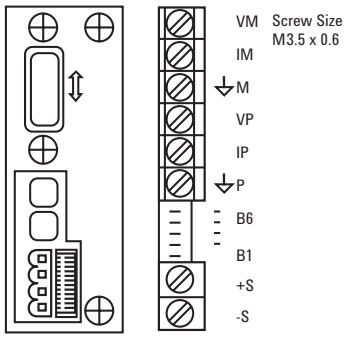
Warranty: One year

Supplemental Characteristics (Non-warranted characteristics determined by design and useful in applying the product)

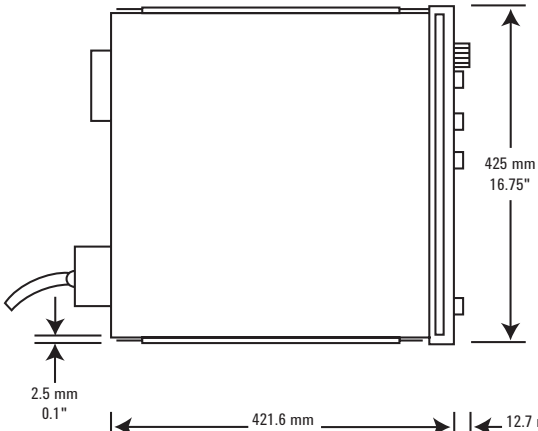
		6030A	6031A	6032A	6033A	6035A	6038A
Programming resolution	Voltage	50 mV	5 mV	15 mV	5 mV	125 mV	15 mV
	Current	4.25 mA	30 mA	12.5 mA	7.5 mA	1.25 mA	2.5 mA
DC floating voltage either terminal can be grounded or floated from chassis ground		±550 V	±240 V	±240 V	±240 V	±550 V	±240 V
AC input current	100 VAC	24 A	24 A	24 A	6 A	24 A	6 A
	120 VAC	24 A	24 A	24 A	6.5 A	24 A	6.5 A
	220 VAC	15 A	15 A	15 A	3.8 A	15 A	3.8 A
	240 VAC	14 A	14 A	14 A	3.6 A	14 A	3.6 A
Weight	Net	16.3 kg (36 lb)	17.2 kg (38 lb)	16.3 kg (36 lb)	9.6 kg (21 lb)	16.3 kg (36 lb)	9.6 kg (21 lb)
	Shipping	21.8 kg (48 lb)	22.7 kg (50 lb)	21.8 kg (48 lb)	11.4 kg (25 lb)	21.8 kg (48 lb)	11.4 kg (25 lb)

Agilent Models: 6030A, 6031A, 6032A, 6035A

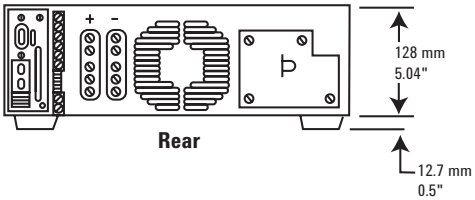
Terminal Strip Detail



Top



Side



Rear

More detailed specifications at **www.agilent.com/find/6030**

Autoranging: 200 W and 1000 W GPIB (Continued)

Ordering information

Opt 001 Front panel has only line switch, line indicator, and OVP adjust (6030A–33A and 6038A only)

Opt 100 87 to 106 VAC, 48 to 63 Hz (power supply output is derated to 75%)

Opt 120 104 to 127 VAC, 47 to 63 Hz

Opt 220 191 to 233 VAC, 48 to 63 Hz

Opt 240 209 to 250 VAC, 48 to 63 Hz

Opt 800 Rack-mount kit for two half-rack units side by side. Lock link kit p/n 5061-9694 and 7-in rack adapter kit 5063-9215

* **Opt 908** Rack-mount kit for a single half-rack unit 6033A and 6038A (with blank filler panel); p/n 5062-3960, 6030A–32A and 6035A; p/n 5062-3977

* **Opt 909** Rack-mount kit with handles. For 6030A–32A, 6035A; p/n 5062-3983

Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package

Opt 0L2 Extra copy of standard printed documentation package

Opt 0B3 Service manual

Opt 0B0 Full documentation on CD-ROM only

Opt J01 Stabilization for loads up to 10 Henries (not available on 6033A)

A line cord option must be specified, see the AC line voltage and cord section.

* Support rails required

Accessories

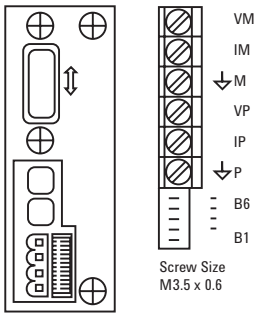
5080-2148 Serial link cable, 2 m (6.6 ft)

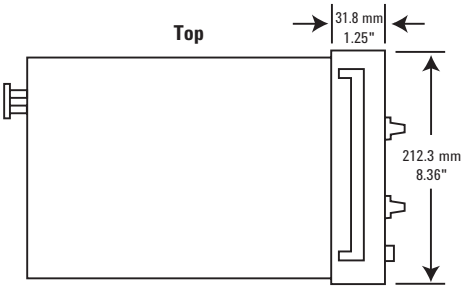
1494-0060 Rack slide kit

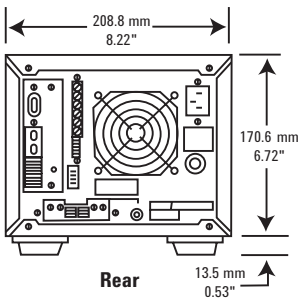
E3663AC Support rails for Agilent rack cabinets

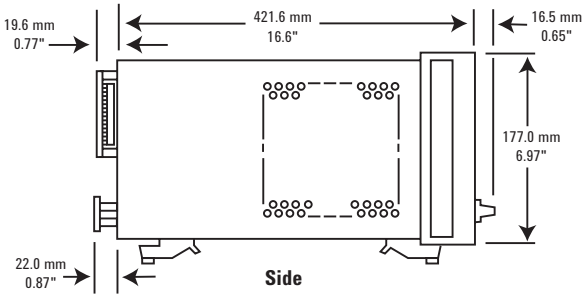
Agilent Models: 6033A, 6038A

Terminal Strip Detail









More detailed specifications at **www.agilent.com/find/6030**

Single-Output
750-1500 W GPIB, LAN, USB, LXI Class C

N5741A*

N5741A - N5772A

- Small size: 1U high
- Universal AC input (85-265 VAC)
- Analog/resistance control of output voltage and current
- Parallel and series connection of multiple supplies
- Built-in measurements and advanced programmable features
- Protection features to ensure DUT safety
- LXI class C compliant

The N5700 Series is a family of affordable 750 W and 1500 W switching regulated, single-output programmable DC power supplies. They offer 24 models for simple DC power application where speed and accuracy are not the primary concern. They provide stable output power, built-in voltage and current measurement, and output voltage and current from 6 V to 600 V and 1.3 A to 180 A.

Small, high-density package
The N5700 provides up to 1500 W in a small space-saving 1U high, 19-inch wide package. Its air vents are in the front, side and rear (not on the top or bottom), so you can stack other instruments directly above or below it to save valuable rack space.

Universal AC input
All models have universal AC input so they can be automatically operated from any AC mains input worldwide. They can be operated from line voltages of 85 – 265 VAC, 47 to 63 Hz, with no switch to set or fuses to change when you switch from one voltage standard to another. They also provide power factor correction.

Specifications (at 0° to 55°C unless otherwise specified)		N5741A	N5742A	N5743A	N5744A	N5745A	N5746A
Number of outputs		1	1	1	1	1	1
GPIB, LAN, USB		Yes	Yes	Yes	Yes	Yes	Yes
Ouput Ratings							
Voltage		6 V	8 V	12.5 V	20 V	30 V	40 V
Current		100 A	90 A	60 A	38 A	25 A	19 A
Power		600 W	720 W	750 W	760 W	750 W	760 W
Programming accuracy							
Voltage	0.05%+	3 mV	4 mV	6.25 mV	10 mV	15 mV	20 mV
Current	0.1%+	100 mA	90 mA	60 mA	38 mA	25 mA	19 mA
Output ripple and noise							
CV p-p (Up to 20 MHz)		60 mV	60 mV	60 mV	60 mV	60 mV	60 mV
CV rms (From 5 Hz – 1 MHz)		8 mV	8 mV	8 mV	8 mV	8 mV	8 mV
Readback accuracy							
Voltage	0.1%+	6 mV	8 mV	12.5 mV	20 mV	30 mV	40 mV
Current	0.1%+	300 mA	270 mA	180 mA	114 mA	75 mA	57 mA
Load regulation (change from 10% to 90%)							
Voltage		2.6 mV	2.8 mV	3.25 mV	4 mV	5 mV	6 mV
Current		25 mA	23 mA	17 mA	12.6 mA	10 mA	8.8 mA
Line regulation (change from 85-132 VAC input or 170-265 VAC input)							
Voltage		2.6 mV	2.8 mV	3.25 mV	4 mV	5 mV	6 mV
Current		12 mA	11 mA	8 mA	5.8 mA	4.5 mA	3.9 mA
Transient response time[1]							
Time		≤1.5 ms	≤1.5 ms	≤1.5 ms	≤1 ms	≤1 ms	≤1 ms

Notes:

[1] Time for output voltage to recover within 0.5% of its rated output for a load change from 10 to 90% of its rated output current. Voltage set point from 10% to 100% of rated output

* AC input connector: IEC 320 connector for 750 W models, and wire clamp connector for 1500 W models

More detailed specifications at **www.agilent.com/find/N5700**

Single-Output 750 W & 1500 W GPIB, LAN, USB (Continued)

Specifications

(at 0° to 55°C unless otherwise specified)

Supplemental Characteristics

(Non-warranted characteristics determined by design that are useful in applying the product)

	N5741A	N5742A	N5743A	N5744A	N5745A	N5746A
Output response time (settle to within ±1.0% of the rated output, with a resistive load)						
Up, full load	0.08 s	0.08 s	0.08 s	0.08 s	0.08 s	0.08 s
Down, full load	0.05 s	0.05 s	0.05 s	0.05 s	0.08 s	0.08 s
Down, no load	0.5 s	0.6 s	0.7 s	0.8 s	0.9 s	1.0 s
Remote sense compensation						
Volts/load lead	1 V	1 V	1 V	1 V	1.5 V	2 V
Output ripple and noise[2]						
CC rms	200 mA	180 mA	120 mA	76 mA	63 mA	48 m
Programming resolution/ measurement resolution						
Voltage	0.72 mV	0.96 mV	1.5 mV	2.4 mV	3.6 mV	4.8 mV
Current	12 mA	10.8 mA	7.2 mA	4.56 mA	3 mA	2.3 mA

Notes:

2 From 5 Hz – 1 MHz, at 10% to 100% of output voltage at full load (for 6 V units from 33% to 100% of output voltage)

Extensive device protection
To safeguard your device from damage, the N5700 series power supplies provide over-temperature, over-current and over-voltage protect (OVP) to shut down the power supply output when a fault occurs. They also offer an undervoltage limit (UVL) that prevents adjustment of the output voltage below a certain limit. The combination of UVL and OVP capabilities lets you create a protection window for sensitive load circuitry.

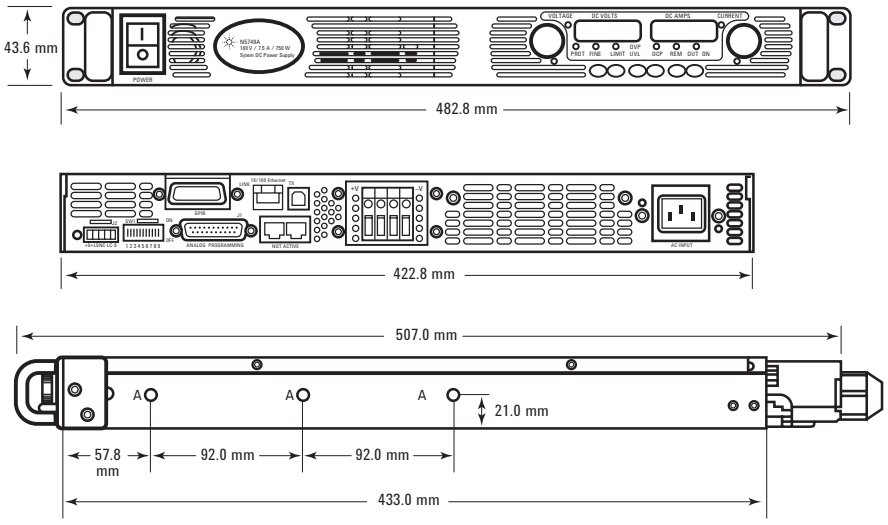
Simplify system connection
The N5700 offers many system oriented features to simplify and accelerate test system development. They support the industry standard SCPI commands and come standard with software drivers.

With built-in GPIB, Ethernet/LAN, and USB 2.0 interfaces, the N5700 gives you the flexibility to use your I/O interface of choice today and in the future.

Additionally, the built-in Web server lets you operate, configure, and monitor the N5700 remotely via a standard browser such as Microsoft Internet Explorer.

Command compatibility
The N5700 includes a compatibility command set for the Xantrex XFR series power supplies, the Sorensen DLM series power supplies, and the Agilent 603x series power supplies. This simplifies system integration when converting to the N5700.

Agilent Models: N5741A - N5772A



More detailed specifications at **www.agilent.com/find/N5700**

Single-Output 750 W & 1500 W GPIB, LAN, USB (Continued)

Analog/resistance programming
For greater programming flexibility and to minimize the time associated with computer interaction, both the output voltage and current can be controlled by an external voltage or resistance programming signal.

Connect multiple units in parallel and series
Should you need greater output power, the N5700 series power supplies give you the flexibility to connect in parallel up to four similarly rated units for greater output current and connect two similarly rated units in series for greater output voltage (see DC float voltage information)

Fan speed control
Lab bench use is enhanced by the fan speed control, which helps to minimize the acoustic noise.

Application notes

Side-by-Side Comparison: Agilent N5700 System DC Source and Sorensen DLM Power Supply
5989-1628EN

Side-by-Side Comparison: Agilent N5700 System DC Source and Xantrex XFR DC Power Supply
5989-1630EN

Trends in Programmable Medium Power (~1 kW) System DC Power Supplies
5989-1331EN

Specifications (at 0° to 55°C unless otherwise specified)	N5747A	N5748A	N5749A	N5750A	N5751A	N5752A
Number of outputs	1	1	1	1	1	1
GPIB, LAN, USB	Yes	Yes	Yes	Yes	Yes	Yes
Ouput ratings						
Voltage	60 V	80 V	100 V	150 V	300 V	600 V
Current	12.5 A	9.5 A	7.5 A	5 A	2.5 A	1.3 A
Power	750 W	760 W	750 W	750 W	750 W	780 W
Programming accuracy						
Voltage 0.05%+	30 mV	40 mV	50 mV	75 mV	150 mV	300 mV
Current 0.1%+	12.5 mA	9.5 mA	7.5 mA	5 mA	2.5 mA	1.3 mA
Output ripple and noise						
CV p-p (Up to 20 MHz)	60 mV	80 mV	80 mV	100 mV	150 mV	300 mV
CV rms (From 5 Hz – 1 MHz)	8 mV	8 mV	8 mV	12 mV	20 mV	60 mV
Readback accuracy						
Voltage 0.1%+	60 mV	80 mV	100 mV	150 mV	300 mV	600 mV
Current 0.1%+	37.5 mA	28.5 mA	22.5 mA	15 mA	7.5 mA	3.9 mA
Load regulation (change from 10% to 90%)						
Voltage	8 mV	10 mV	12 mV	17 mV	32 mV	62 mV
Current	7.5 mA	6.9 mA	6.5 mA	6 mA	5.5 mA	5.26 mA
Line regulation (change from 85-132 VAC input or 170-265 VAC input)						
Voltage	8 mV	10 mV	12 mV	17 mV	32 mV	62 mV
Current	3.25 mA	2.95 mA	2.75 mA	2.5 mA	2.25 mA	2.13 mA
Transient response time[1]						
Time	≤ 1 ms	≤ 1 ms	≤ 1 ms	≤ 2 ms	≤ 2 ms	≤ 2 ms

Supplemental Characteristics Non-warranted characteristics determined by design that are useful in applying the product)						
Output response time (settle to within ±1.0% of the rated output, with a resistive load)						
Up, full load	0.08 s	0.15 s	0.15 s	0.15 s	0.15 s	0.25 s
Down, full load	0.08 s	0.15 s	0.15 s	0.15 s	0.15 s	0.30 s
Down, no load	1.1 s	1.2 s	1.5 s	2.0 s	3.0 s	4.0 s
Remote sense compensation						
Volts/load lead	3 V	4 V	5 V	5 V	5 V	5 V
Output ripple and noise[2]						
CC rms	38 mA	29 mA	23 mA	18 mA	13 mA	8 mA
Programming resolution/ measurement resolution						
Voltage	7.2 mV	9.6 mV	12 mV	18 mV	36 mV	72 mV
Current	1.5 mA	1.14 mA	0.9 mA	0.6 mA	0.3 mA	0.156 mA

Notes:

1 Time for output voltage to recover within 0.5% of its rated output for a load change from 10 to 90% of its rated output current. Voltage set point from 10% to 100% of rated output

2 From 5 Hz – 1 MHz, at 10% to 100% of output voltage at full load (for 6 V units from 33% to 100% of output voltage)

More detailed specifications at **www.agilent.com/find/N5700**

Single-Output 750 W & 1500 W GPIB, LAN, USB (Continued)

Supplemental characteristics for all model numbers

Command processing time: Average time required for the output voltage to begin to change following receipt of digital data is 55 ms.

DC floating voltage:

6 V to 60 V units
No output terminal may be more than ±60 VDC from any other terminal or chassis ground

80 V to 600 V units
No output terminal may be more than ±600 VDC from any other terminal or chassis ground

Modulation: (Analog programming of output voltage and current)

Input signal: selectable, 0 to 5 V/0 to 10 V full scale

Input impedance: selectable, 0 to 5 kΩ/0 to 10 kΩ full scale

I/O interface: GPIB, LAN, USB standard

Software driver:

- IVI-COM
- LabVIEW

AC input:

Input range: 85 – 265 VAC; 47 – 63 Hz

Input current 750 W: 10.5 A at 100 VAC nominal; 5 A at 200 VAC nominal

Input current 1500 W: 21 A at 100 VAC nominal; 11 A at 200 VAC nominal

Notes:

1 Time for output voltage to recover within 0.5% of its rated output for a load change from 10 to 90% of its rated output current. Voltage set point from 10% to 100% of rated output

2 From 5 Hz – 1 MHz, at 10% to 100% of output voltage at full load (for 6 V units from 33% to 100% of output voltage)

Specifications (at 0° to 55°C unless otherwise specified)		N5761A	N5762A	N5763A	N5764A	N5765A	N5766A
Number of outputs		1	1	1	1	1	1
GPIB, LAN, USB		Yes	Yes	Yes	Yes	Yes	Yes
Ouput ratings							
Voltage		6 V	8 V	12.5 V	20 V	30 V	40 V
Current		180 A	165 A	120 A	76 A	50 A	38 A
Power		1080 W	1320 W	1500 W	1520 W	1500 W	1520 W
Programming accuracy							
Voltage	0.05%+	3 mV	4 mV	6.25 mV	10 mV	15 mV	20 mV
Current	0.1%+	180 mA	165 mA	120 mA	76 mA	50 mA	38 mA
Output ripple and noise							
CV p-p (Up to 20 MHz)		60 mV	60 mV	60 mV	60 mV	60 mV	60 mV
CV rms (From 5 Hz – 1 MHz)		8 mV	8 mV	8 mV	8 mV	8 mV	8 mV
Readback accuracy							
Voltage	0.1%+	6 mV	8 mV	12.5 mV	20 mV	30 mV	40 mV
Current	0.1%+	540 mA	495 mA	360 mA	228 mA	150 mA	114 mA
Load regulation (change from 10% to 90%)							
Voltage		2.6 mV	2.8 mV	3.25 mV	4 mV	5 mV	6 mV
Current		41 mA	38 mA	29 mA	20.2 mA	15 mA	12.6 mA
Line regulation (change from 85-132 VAC input or 170-265 VAC input)							
Voltage		2.6 mV	2.8 mV	3.25 mV	4 mV	5 mV	6 mV
Current		20 mA	18.5 mA	14 mA	9.6 mA	7 mA	5.8 mA
Transient response time[1]							
Time		≤ 1.5 ms	≤ 1.5 ms	≤ 1.5 ms	≤ 1 ms	≤ 1 ms	≤ 1 ms

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)

Output response time (settle to within ±1.0% of the rated output, with a resistive load)							
Up, full load		0.08 s	0.08 s	0.08 s	0.08 s	0.08 s	0.08 s
Down, full load		0.05 s	0.05 s	0.05 s	0.05 s	0.08 s	0.08 s
Down, no load		0.5 s	0.6 s	0.7 s	0.8 s	0.9 s	1.0 s
Remote sense compensation							
Volts/load lead		1 V	1 V	1 V	1 V	1.5 V	2 V
Output ripple and noise[2]							
CC rms		360 mA	330 mA	240 mA	152 mA	125 mA	95 mA
Programming resolution/ measurement resolution							
Voltage		0.72 mV	0.96 mV	1.5 mV	2.4 mV	3.6 mV	4.8 mV
Current		21.6 mA	19.8 mA	14.4 mA	9.12 mA	6 mA	4.6 mA

More detailed specifications at **www.agilent.com/find/N5700**

Single-Output 750 W & 1500 W GPIB, LAN, USB (Continued)

Power factor: 0.99 at nominal input and rated output power

Regulatory compliance: European EMC directive 89/336/EEC for Class A products, Australian C-Tick mark, this ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada. European Low Voltage Directive 73/23/EEC.

Size: 43.6 mm H x 422.8 mm W x 432.8 mm D (1.72 in x 16.65 in x 17.04 in), excluding connectors and handles

Weight: Net, 750 W – 7 Kg (15.4 lbs); 1500 W – 8.5 Kg (18.7 lbs)

Warranty: One year

Ordering information

For N574x and N575x (750 W Models)

Opt 900 Power Cord, United Kingdom

Opt 902 Power Cord, Europe

Opt 903 Power Cord, USA, Canada

Opt 918 Power Cord, Japan

Opt 922 Power Cord, China

For N576x and N577x (1500 W Models)

Opt 861 Unterminated power cord, USA, Canada, China, Japan, Other

Opt 862 Harmonized unterminated power cord, Europe

Accessories for all N5700 Models

N5740A Rack mount slide kit (required for rack mounting; standard system II rack mounting hardware will not work).

Specifications (at 0° to 55°C unless otherwise specified)	N5767A	N5768A	N5769A	N5770A	N5771A	N5772A
Number of outputs	1	1	1	1	1	1
GPIB, LAN, USB	Yes	Yes	Yes	Yes	Yes	Yes
Ouput ratings						
Voltage	60 V	80 V	100 V	150 V	300 V	600 V
Current	25 A	19 A	15 A	10 A	5 A	2.6 A
Power	1500 W	1520 W	1500 W	1500 W	1500 W	1560 W
Programming accuracy						
Voltage 0.05%+	30 mV	40 mV	50 mV	75 mV	150 mV	300 mV
Current 0.1%+	25 mA	19 mA	15 mA	10 mA	5 mA	2.6 mA
Output ripple and noise						
CV p-p (Up to 20 MHz)	60 mV	80 mV	80 mV	100 mV	150 mV	300 mV
CV rms (From 5 Hz – 1 MHz)	8 mV	8 mV	8 mV	12 mV	20 mV	60 mV
Readback accuracy						
Voltage 0.1%+	60 mV	80 mV	100 mV	150 mV	300 mV	600 mV
Current 0.1%+	75 mA	57 mA	45 mA	30 mA	15 mA	7.8 mA
Load regulation (change from 10% to 90%)						
Voltage	8 mV	10 mV	12 mV	17 mV	32 mV	62 mV
Current	10 mA	8.8 mA	8 mA	7 mA	6 mA	5.5 mA
Line regulation (change from 85-132 VAC input or 170-265 VAC input)						
Voltage	8 mV	10 mV	12 mV	17 mV	32 mV	62 mV
Current	4.5 mA	3.9 mA	3.5 mA	3 mA	2.5 mA	2.26 mA
Transient response time[1]						
Time	≤ 1 ms	≤ 1 ms	≤ 1 ms	≤ 2 ms	≤ 2 ms	≤ 2 ms

Supplemental Characteristics (Non-warranted characteristics determined by design and useful in applying the product)

Output response time (settle to within ±1.0% of the rated output, with a resistive load)						
Up, full load	0.08 s	0.15 s	0.15 s	0.15 s	0.15 s	0.25 s
Down, full load	0.08 s	0.15 s	0.15 s	0.15 s	0.15 s	0.30 s
Down, no load	1.1 s	1.2 s	1.5 s	2.0 s	3.0 s	4.0 s
Remote sense compensation						
Volts/load lead	3 V	4 V	5 V	5 V	5 V	5 V
Output ripple and noise[2]						
CC rms	75 mA	57 mA	45 mA	35 mA	25 mA	12 mA
Programming resolution/ measurement resolution						
Voltage	7.2 mV	9.6 mV	12 mV	18 mV	36 mV	72 mV
Current	3 mA	2.28 mA	1.8 mA	1.2 mA	0.6 mA	0.312 mA

Notes:

1 Time for output voltage to recover within 0.5% of its rated output for a load change from 10 to 90% of its rated output current. Voltage set point from 10% to 100% of rated output

2 From 5 Hz – 1 MHz, at 10% to 100% of output voltage at full load (for 6 V units from 33% to 100% of output voltage)

More detailed specifications at **www.agilent.com/find/N5700**

Single-Output
3.3-5.2 KW GPIB, LAN, USB, LXI Class C

N8740*

N8731A - N8762A

21 Models: 3300 W and 5200 W output power
Up to 600 V and up to 400 A
Small, high density 2U package
Built-in voltage and current measurement
Full protection from over-voltage and over-current
Flexible AC input voltage options
LAN, USB, and GPIB interfaces standard
Fully compliant to LXI Class C specification

The Agilent Technologies N8700 series system DC power supplies give you just the right performance – at just the right price – in a compact (2 U) package. This family of affordable 3300 W and 5000 W single-output programmable DC power supplies consists of 21 models for simple DC power applications.

They provide stable output power, built-in voltage and current measurement, and output voltage and current from 8 V to 600 V and 5.5 A to 400 A.

Small, high-density package
The N8700 provides up to 5200 W in a small space-saving 2U high, 19-inch wide package. Its air vents are in the front and rear (not on the top or bottom), so you can stack other instruments directly above or below it to save valuable rack space.

Flexible AC input voltage options
The N8700 models offer flexible AC input voltage options. Every N8700 model can be purchased with either a 208 V 3-phase or 400 V 3-phase voltage input option. The 3.3 kW models have the additional option of a 230 V single-phase AC input voltage. Choose the one that best fits your operating environment. They also provide power factor correction.

Specifications (at 0° to 55°C unless otherwise specified)		N8731A	N8732A	N8733A	N8734A	N8735A	N8736A
Number of outputs		1	1	1	1	1	1
GPIB, LAN, USB		Yes	Yes	Yes	Yes	Yes	Yes
Ouput Ratings							
Voltage[1]		8 V	10 V	15 V	20 V	30 V	40 V
Current[2]		400 A	330 A	220 A	165 A	110 A	85 A
Power		3200 W	3300 W	3300 W	3300 W	3300 W	3400 W
Programming accuracy							
Voltage[1]	0.05%+	4 mV	5 mV	7.5 mV	10 mV	15 mV	20 mV
Current[2, 6]	0.1%+	800 mA	660 mA	440 mA	330 mA	220 mA	170 mA
Output ripple and noise							
CV p-p (Up to 20 MHz)		60 mV	60 mV	60 mV	60 mV	60 mV	60 mV
CV rms (From 5 Hz – 1 MHz)		8 mV	8 mV	8 mV	8 mV	8 mV	8 mV
Measurement accuracy							
Voltage	0.1%+	8 mV	10 mV	15 mV	20 mV	30 mV	40 mV
Current[6]	0.1%+	1200 mA	990 mA	660 mA	495 mA	330 mA	255 mA
Load effect							
CV load regulation[3]		6.2 mV	6.5 mV	7.25 mV	8 mV	9.5 mV	11 mV
CC load regulation[4]		85 mA	71 mA	49 mA	38 mA	27 mA	22 mA
Source effect							
CV line regulation[5]		2.8 mV	3 mV	3.5 mV	4 mV	5 mV	6 mV
CC line regulation[5]		42 mA	35 mA	24 mA	18.5 mA	13 mA	10.5 mA
Load transient recovery time							
Time[7]		<1 ms	<1 ms	<1 ms	<1 ms	<1 ms	<1 ms

Notes:

1 Minimum voltage is guaranteed to maximum 0.2% of rated output voltage.

2 Minimum current is guaranteed to maximum 0.4% of rated output current.

3 From no-load to full-load, constant input voltage. Maximum drop in remote sense.

4 For load voltage change equal to the unit voltage rating, constant input voltage

5 Single-phase and 3-Phase 208 V models: 170~265 VAC, constant load.
3-Phase 400 V models: 342~460 VAC, constant load.

6 The constant current programming readback and monitoring accuracy does not include the warm-up and load regulation thermal drift.

7 Time for output voltage to recover within 0.5% of its rated output for a load change 10 - 90% of rated output current, local sense.

* Rear panel with wire clamp connectors for 150 V to 600 V models (shown with 400 V 3-phase AC input option)

More detailed specifications at **www.agilent.com/find/N8700**

Single-Output 3.3-5.2 KW GPIB, LAN, USB (Continued)

Extensive device protection
To safeguard your device from damage, the N8700 series power supplies provide over-temperature, over-current and over-voltage protect (OVP) to shut down the power supply output when a fault occurs. They also offer an undervoltage limit (UVL) that prevents adjustment of the output voltage below a certain limit. The combination of UVL and OVP capabilities lets you create a protection window for sensitive load circuitry.

Simplify system connection
The N8700 offers many system oriented features to simplify and accelerate test system development. They support the industry standard SCPI commands and come standard with software drivers.

With built-in GPIB, Ethernet/LAN, and USB 2.0 interfaces, the N8700 gives you the flexibility to use your I/O interface of choice today and in the future.

Additionally, the built-in Web server lets you operate, configure, and monitor the N8700 remotely via a standard browser such as Microsoft® Internet Explorer.

Analog programming and monitoring
The output voltage and current can be programmed from zero to full scale by either an analog voltage 0 to 5 V or 0 to 10 V or by resistance of 0 to 5 kΩ or 0 to 10 kΩ.

Specifications (at 0° to 55°C unless otherwise specified)	N8731A	N8732A	N8733A	N8734A	N8735A	N8736A
Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)						
Output response time						
Up-prog response time[8]	80 ms	80 ms	80 ms	80 ms	80 ms	80 ms
Down-prog response time Full-load[8]	20 ms	100 ms	100 ms	100 ms	160 ms	160 ms
Down-prog response time No-load[9]	500 ms	600 ms	700 ms	800 ms	900 ms	1000 ms
Remote sense compensation	2 V	2 V	2 V	2 V	5 V	5 V
Output ripple and noise						
CC rms[10]	1300 mA	1200 mA	880 mA	660 mA	300 mA	200 m
Programming resolution **Measurement resolution**						
Voltage	0.96 mV	1.2 mV	1.8 mV	2.4 mV	3.6 mV	4.8 mV
Current	48 mA	39.6 mA	26.4 mA	19.8 mA	13.2 mA	10.2 mA

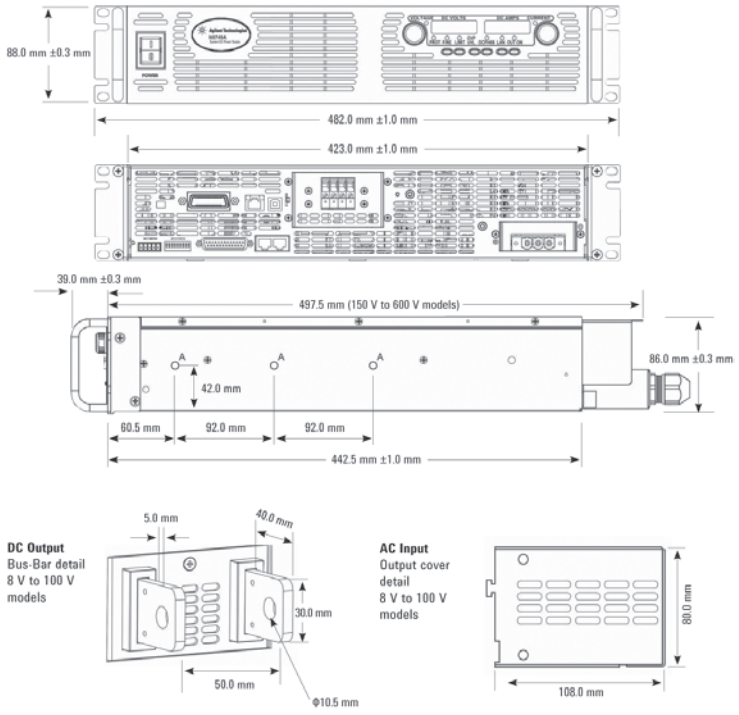
Notes:

8 From 10% to 90% or 90% to 10% of rated output voltage, with rated, resistive load.

9 From 90% to 10% of rated output voltage.

10 For 8 V - 15 V models the ripple is measured from 2 V to rated output voltage and rated output current. For other models, the ripple is measured at 10 - 100% of rated output voltage and rated output current.

Agilent Models: N8731A-42A, N8754A-62A



More detailed specifications at **www.agilent.com/find/N8700**

Single-Output 3.3-5.2 KW GPIB, LAN, USB (Continued)

Connect multiple units in parallel and series

Should you need greater output power, the N8700 series power supplies give you the flexibility to connect in parallel up to four identical units (same model number) for greater output current or connect two identical units (same model number) in series for greater output voltage (see output terminal isolation information).

Fan speed control

Lab bench use is enhanced by the fan speed control, which helps to minimize the acoustic noise.

Application notes

Selecting DC Sources for Telecommunications Equipment Test Systems
5990-4370EN

Power Sources for Energy-Efficient High Input Voltage Telecommunications Equipment Development
5990-4371EN

Notes:

1 Minimum voltage is guaranteed to maximum 0.2% of rated output voltage.

2 Minimum current is guaranteed to maximum 0.4% of rated output current.

3 From no-load to full-load, constant input voltage. Maximum drop in remote sense.

4 For load voltage change equal to the unit voltage rating, constant input voltage

5 Single-phase and 3-Phase 208 V models: 170~265 VAC, constant load. 3-Phase 400 V models: 342~460 VAC, constant load.

6 The constant current programming readback and monitoring accuracy does not include the warm-up and load regulation thermal drift.

7 Time for output voltage to recover within 0.5% of its rated output for a load change 10 - 90% of rated output current, local sense.

8 From 10% to 90% or 90% to 10% of rated output voltage, with rated, resistive load.

9 From 90% to 10% of rated output voltage.

10 For 8 V - 15 V models the ripple is measured from 2 V to rated output voltage and rated output current. For other models, the ripple is measured at 10 - 100% of rated output voltage and rated output current.

Specifications (at 0° to 55°C unless otherwise specified)		**N8737A**	**N8738A**	**N8739A**	**N8740A**	**N8741A**	**N8742A**
Number of outputs		1	1	1	1	1	1
GPIB, LAN, USB		Yes	Yes	Yes	Yes	Yes	Yes
Ouput ratings							
Voltage[1]		60 V	80 V	100 V	150 V	300 V	600 V
Current[2]		55 A	42 A	33 A	22 A	11 A	5.5 A
Power		3300 W	3360 W	3300 W	3300 W	3300 W	3300 W
Programming accuracy							
Voltage[1]	0.05%+	30 mV	40 mV	50 mV	75 mV	150 mV	300 mV
Current[2, 6]	0.1%+	110 mA	84 mA	66 mA	44 mA	22 mA	11 mA
Output ripple and noise							
CV p-p (Up to 20 MHz)		60 mV	80 mV	100 mV	100 mV	300 mV	500 mV
CV rms (From 5 Hz – 1 MHz)		8 mV	25 mV	25 mV	25 mV	100 mV	120 mV
Measurement accuracy							
Voltage	0.1%+	60 mV	80 mV	100 mV	150 mV	300 mV	600 mV
Current[6]	0.1%+	165 mA	126 mA	99 mA	66 mA	33 mA	16.5 mA
Load effect							
CV load regulation[3]		14 mV	17 mV	20 mV	27.5 mV	50 mV	95 mV
CC load regulation[4]		16 mA	13.4 mA	11.6 mA	9.4 mA	7.2 mA	6.1 mA
Source effect							
CV line regulation[5]		8 mV	10 mV	12 mV	17 mV	32 mV	62 mV
CC line regulation[5]		7.5 mA	6.2 mA	5.3 mA	4.2 mA	3.1 mA	2.6 mA
Load transient recovery time							
Time[7]		≤ 1 ms	≤ 1 ms	≤ 1 ms	≤ 2 ms	≤ 2 ms	≤ 2 ms

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)

Output response time							
Up-prog response time[8]		150 ms	150 ms	150 ms	150 ms	150 ms	250 ms
Down-prog response time Full-load[8]		160 ms	300 ms	300 ms	300 ms	300 ms	500 ms
Down-prog response time No-load[9]		1100 ms	1200 ms	1500 ms	2000 ms	3500 ms	4000 ms
Remote sense compensation		5 V	5 V	5 V	5 V	5 V	5 V
Output ripple and noise							
CC rms[10]		100 mA	80 mA	70 mA	60 mA	20 mA	10 mA
Programming resolution							
Measurement resolution							
Voltage		7.2 mV	9.6 mV	12 mV	18 mV	36 mV	72 mV
Current		6.6 mA	5 mA	4 mA	2.6 mA	1.3 mA	0.66 mA

More detailed specifications at **www.agilent.com/find/N8700**

Single-Output 3.3-5.2 KW GPIB, LAN, USB (Continued)

Supplemental characteristics for all model numbers

Command response time: Average time required for the output voltage to begin to change following receipt of digital data is 100 ms.

Output terminal isolation:

8 V to 60 V units
No output terminal may be more than ±60 VDC from any other terminal or chassis ground

80 V to 600 V units
No positive output terminal may be more than ± 600 VDC from any other terminal or chassis ground.

No negative output terminal may be more than ± 400 VDC from any other terminal or chassis ground.

Modulation: (Analog programming of output voltage and current)

Input signal: selectable, 0 to 5 V/0 to 10 V full scale

Input impedance: selectable, 0 to 5 kΩ/0 to 10 kΩ full scale

I/O interface: GPIB, LAN, USB standard

Software driver:

- IVI-COM
- LabVIEW

AC input:

Input range:
230 VAC single-phase option
170 - 265 VAC; 47 - 63 Hz;
3.3 kW models only

208 VAC 3-phase option
170 - 265 VAC; 47 - 63 Hz

400 VAC 3-phase option
342 - 460 VAC; 47 - 63 Hz

Input current:
230 VAC single-phase
3.3 kW models only: 23 - 24 A Max @ 100% load

208 VAC 3-phase option
3.3 kW models: 13.6 - 14.5 A Max @ 100% load
5 kW models: 21-22 A max @ 100% load

400 VAC 3-phase option
3.3 kW models: 6.8 - 7.2 A Max @ 100% load
5 kW models: 10.5 - 12 A Max @ 100% load

Specifications (at 0° to 55°C unless otherwise specified)		**N8754A**	**N8755A**	**N8756A**	**N8757A**	**N8758A**
Number of outputs		1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes
Output ratings						
Voltage[1]		20 V	30 V	40 V	60 V	80 V
Current[2]		250 A	170 A	125 A	85 A	65 A
Power		5000 W	5100 W	5000 W	5100 W	5200 W
Programming accuracy						
Voltage[1]	0.025% +	15 mV	22.5 mV	30 mV	45 mV	60 mV
Current[2, 6]	0.1% +	750 mA	510 mA	375 mA	255 mA	195 mA
Output ripple and noise						
CV p-p (Up to 20 MHz)		75 mV	75 mV	75 mV	75 mV	100 mV
CV rms (From 5 Hz – 1 MHz)		10 mV	10 mV	10 mV	10 mV	15 mV
Measurement accuracy						
Voltage	0.025% +	25 mV	37.5 mV	50 mV	75 mV	100 mV
Current[6]	0.15% +	750 mA	510 mA	375 mA	255 mA	195 mA
Load effect						
CV load regulation[3]		8 mV	9.5 mV	11 mV	14 mV	17 mV
CC load regulation[4]		250 mA	170 mA	125 mA	85 mA	65 mA
Source effect						
CV line regulation[5]		2 mV	3 mV	4 mV	6 mV	8 mV
CC line regulation[5]		125 mA	85 mA	62.5 mA	42.5 mA	32.5 mA
Load transient recovery time						
Time[7]		<1 ms	<1 ms	<1 ms	<1 ms	<1 ms
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)				
Output response time						
Up-prog response time[8]		30 ms	30 ms	30 ms	50 ms	50 ms
Down-prog response time Full-load[8]		50 ms	80 ms	80 ms	80 ms	100 ms
Down-prog response time No-load[9]		700 ms	800 ms	900 ms	1000 ms	1200 ms
Remote sense compensation		2 V	5 V	5 V	5 V	5 V
Output ripple and noise						
CC rms[10]		1000 mA	460 mA	300 mA	150 mA	120 mA
Programming resolution Measurement resolution						
Voltage		2.4 mV	3.6 mV	4.8 mV	7.2 mV	9.6 mV
Current		30 mA	20.4 mA	15 mA	10.2 mA	7.8 mA

Notes:

1 Minimum voltage is guaranteed to maximum 0.2% of rated output voltage.

2 Minimum current is guaranteed to maximum 0.4% of rated output current.

3 From no-load to full-load, constant input voltage. Maximum drop in remote sense.

4 For load voltage change equal to the unit voltage rating, constant input voltage

5 Single-phase and 3-Phase 208 V models: 170~265 VAC, constant load.
3-Phase 400 V models: 342~460 VAC, constant load.

6 The constant current programming readback and monitoring accuracy does not include the warm-up and load regulation thermal drift.

7 Time for output voltage to recover within 0.5% of its rated output for a load change 10 - 90% of rated output current, local sense.

8 From 10% to 90% or 90% to 10% of rated output voltage, with rated, resistive load.

9 From 90% to 10% of rated output voltage.

10 For 8 V - 15 V models the ripple is measured from 2 V to rated output voltage and rated output current. For other models, the ripple is measured at 10 - 100% of rated output voltage and rated output current.

More detailed specifications at **www.agilent.com/find/N8700**

Single-Output 3.3-5.2 KW GPIB, LAN, USB (Continued)

Power factor: 230 VAC single-phase option 3.3 kW models only: 0.99 at nominal input and rated output power

208 & 400 VAC 3-phase options 3.3 kW models: 0.95 at nominal input and rated output power 5 kW models: 0.94 at nominal input and rated output power

Regulatory compliance: European EMC directive 89/336/EEC for Class A products, Australian C-Tick mark, this ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada. European Low Voltage Directive 73/23/EEC.

Size: 88 mm H x 423 mm W x 442.5 mm D (3.46 in x 16.65 in x 17.42 in), excluding connectors and handles

Weight: Net, 3.3 kW – 13 Kg (28.6 lbs); 5 kW – 16 Kg (35.2 lbs)

Warranty: One year

Ordering information

Opt 861 Unterminated line cord for 208 V 3-phase AC input voltage (Option 208)

Opt 862 Unterminated line cord for 400 V 3-phase AC input voltage (Option 400)

Opt 831 Unterminated line cord for 230 V single-phase AC input voltage (Option 230)

Opt 832 Unterminated, harmonized line cord for Europe for 230 V single-phase AC input voltage (Option 230)

Opt 208 190-240 V, 3-phase AC, 50/60 Hz input (use with line cord Opt 861)

Opt 400 380-415 V, 3-phase AC, 50/60 Hz input (use with line cord Opt 862)

Opt 230 190-240 V, single-phase AC, 50/60 Hz input (use with line cord Opt 831 or 832)

Accessories for all N8700 Models

N5740A Rack mount slide kit (required for rack mounting; standard system rack mounting hardware will not work).

Specifications (at 0° to 55°C unless otherwise specified)		**N8759A**	**N8760A**	**N8761A**	**N8762A**
Number of outputs		1	1	1	1
GPIB		No	No	No	No
Output ratings					
Voltage[1]		100 V	150 V	300 V	600 V
Current[2]		50 A	34 A	17 A	8.5 A
Power		5000 W	5100 W	5100 W	5100 W
Programming accuracy					
Voltage[1]	0.025%+	75 mV	112.5 mV	225 mV	450 mV
Current[2, 6]	0.1% +	150 mA	102 mA	51 mA	25.5 mA
Output ripple and noise					
CV p-p (Up to 20 MHz)		100 mV	120 mV	300 mV	500 mV
CV rms (From 5 Hz – 1 MHz)		15 mV	25 mV	60 mV	120 mV
Measurement accuracy					
Voltage	0.025%+	125 mV	187.5 mV	375 mV	750 mV
Current[6]	0.1%+	150 mA	102 mA	51 mA	25.5 mA
Load effect					
CV load regulation[3]		20 mV	27.5 mV	50 mV	95 mV
CC load regulation[4]		50 mA	34 mA	17 mA	8.5 mA
Source effect					
CV line regulation[5]		10 mV	15 mV	30 mV	60 mV
CC line regulation[5]		25 mA	17 mA	8.5 mA	4.3 mA
Load transient recovery time					
Time[7]		<1 ms	<2 ms	<2 ms	<2 ms
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)			
Output response time					
Up-prog response time[8]		50 ms	50 ms	50 ms	100 ms
Down-prog response time Full-load[8]		100 ms	100 ms	100 ms	200 ms
Down-prog response time No-load[9]		1500 ms	2000 ms	2500 ms	3000 ms
Remote sense compensation		5 V	5 V	5 V	5 V
Output ripple and noise					
CC rms[10]		100 mA	90 mA	30 mA	15 mA
Programming resolution **Measurement resolution**					
Voltage		12 mV	18 mV	36 mV	72 mV
Current		6 mA	4.1 mA	2 mA	1 mA

Notes:

1 Minimum voltage is guaranteed to maximum 0.2% of rated output voltage.

2 Minimum current is guaranteed to maximum 0.4% of rated output current.

3 From no-load to full-load, constant input voltage. Maximum drop in remote sense.

4 For load voltage change equal to the unit voltage rating, constant input voltage

5 Single-phase and 3-Phase 208 V models: 170~265 VAC, constant load. 3-Phase 400 V models: 342~460 VAC, constant load.

6 The constant current programming readback and monitoring accuracy does not include the warm-up and load regulation thermal drift.

7 Time for output voltage to recover within 0.5% of its rated output for a load change 10 - 90% of rated output current, local sense.

8 From 10% to 90% or 90% to 10% of rated output voltage, with rated, resistive load.

9 From 90% to 10% of rated output voltage.

10 For 8 V - 15 V models the ripple is measured from 2 V to rated output voltage and rated output current. For other models, the ripple is measured at 10 - 100% of rated output voltage and rated output current.

More detailed specifications at **www.agilent.com/find/N8700**

High Performance DC Power Supplies...

speed and accuracy for test optimization

Agilent high performance DC power supplies provide the features and performance necessary to satisfy the most demanding requirements. For system designers who are striving to shorten test time and maximize production throughput, the Agilent high performance DC power supplies will help them achieve their goals.

Multiple output power supplies reduce rack space. The advanced programmable capabilities allow for efficient system design and maintenance. Also their programming and measurement accuracy, and their DUT protection features, make them an excellent value for the R&D lab.

Comparison Summary	Agilent basic DC power supplies	Agilent high performance DC power supplies
Output power	30 W-1500 W	40 W-6600 W
Number of outputs	1-3	1-8
GPIB programming and measurement speed	Moderate	Fast
Output rise/fall time	Moderate	Fast
Convenient 1/2 rack-size for bench-top use	Yes	No
Active downprogrammer for enhanced test throughput	No	Yes
Stored wake-up state	No	Yes
Programmable capabilities	Moderate	Extensive
Protection for the DUT	Moderate	Extensive

More detailed specifications at **www.agilent.com/find/power**

6611C - 6614C

Single-Output
40-50 W GPIB

Small, compact size for bench and system use
Fast, low-noise outputs
Dual-range, precision low current measurement
Built-in measurements and advanced programmable features
Protection features to ensure DUT safety

This series of linear-regulated 40-50 W DC power supplies is designed to maximize the throughput of DUTs through the manufacturing test process with fast programming and measurement, and also active downprogramming. It offers many advanced programmable features including stored states and status reporting. Programming is done using industry standard SCPI commands via the GPIB or RS-232. Test system integration is further simplified by using the VXI*Plug&Play* drivers. The optional relays simplify system design and troubleshooting.

The half-rack size of the 6610A series makes it a convenient DC power supply for the R&D lab bench. The built-in microamp measurement system helps the engineer to easily and accurately monitor the output voltage and current without a complicated test setup.

Application notes

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

10 Hints for Using Your Power Supply to Decrease Test Time
5968-6359E

Understanding Linear Power Supply Operation (AN1554)
5989-2291EN

Specifications (at 0° to 55°C unless otherwise specified)		6611C	6612C	6613C	6614C	6611C-J05 Special order option
Number of outputs		1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes
Output ratings						
Voltage		0 to 8 V	0 to 20 V	0 to 50 V	0 to 100 V	0 to 10 V
Current		0 to 5 A	0 to 2 A	0 to 1 A	0 to 0.5 A	0 to 5 A
Programming accuracy (at 25°C ±5°C)						
Voltage		5 mV	10 mV	20 mV	50 mV	5 mV
+Current	0.05% +	2 mA	1 mA	0.75 mA	0.5 mA	2 mA
Ripple and noise 20 Hz to 20 MHz, with outputs ungrounded or with either terminal grounded						
Voltage	rms	0.5 mV	0.5 mV	0.5 mV	0.5 mV	0.5 mV
	peak -to-peak	3 mV	3 mV	4 mV	5 mV	3 mV
Normal mode	rms	2 mA	1 mA	1 mA	1 mA	2 mA
DC measurement accuracy via GPIB or front-panel meters with respect to actual output at 25°C ±5°C						
Voltage	0.03% +	2 mV	3 mV	6 mV	12 mV	2 mV
Low current range -20 mA to + 20 mA	0.1% +	2.5 µA	2.5 µA	2.5 µA	2.5 µA	2.5 µA
High current range +20 mA to + rated I	0.2% +	0.5 mA	0.25 mA	0.2 mA	0.1 mA	0.5 mA
-20 mA to - rated I	0.2% +	1.1 mA	0.85 mA	0.8 mA	0.7 mA	1.1 mA
Load regulation						
Voltage		2 mV	2 mV	4 mV	5 mV	2 mV
Current		1 mA	0.5 mA	0.5 mA	0.5 mA	1 mA
Line regulation						
Voltage		0.5 mV	0.5 mV	1 mV	1 mV	0.5 mV
Current		0.5 mA	0.5 mA	0.25 mA	0.25 mA	0.5 mA

Transient response time Less than 100 µs for the output to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of the output current rating of the supply

Supplemental Characteristics	(Non-warranted characteristics determined by design and useful in applying the product)				
Average programming resolution					
Voltage	2 mV	5 mV	12.5 mV	25 mV	3 mV
Current	1.25 mA	0.5 mA	0.25 mA	0.125 mA	1.25 mA
Sink current	3 A	1.2 A	0.6 A	0.3 A	3 A

More detailed specifications at **www.agilent.com/find/6610**

Single-Output: 40-50 W GPIB (Continued)

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC maximum from chassis ground

Remote sensing: Up to two volts dropped in each load lead. Add 2 mV to the voltage load regulation specification for each one volt change in the postive output lead due to load current change.

Command processing time: Average time required for the output voltage to begin to change following receipt of digital date is 4 ms for the power supplies connected directly to the GPIB.

Output programming response time: The rise and fall time (10/90% and 90/10%) of the output voltage is less than 2 ms. The output voltage change settles within 1 LSB (0.025% x rated voltage) of final value in less than 6 ms.

GPIB interface capabilities: IEEE-488.2, SCPI command set, and 6630A Series programming compatability

Input power: (full load): 1.6 A, 100 W (6611C: 2.2 A, 120 W)

Regulatory compliance: Complies with EMC directive 89/336/EEC (ISM 1B).

Software driver: VXI*Plug&Play*

Size: 212.8 mm W x 88.1 mm H x 368.3 mm D (8.4 in x 3.5 in x 14.5 in)

Weight: 8.2 kg (18.16 lb) net; 10.6 kg (23.5 lb) shipping

Warranty: One year

Ordering information

Opt 100 87 to 106 VAC, 47 to 63 Hz

Opt 120 104 to 127 VAC, 47 to 63 Hz

Opt 220 191 to 233 VAC, 47 to 63 Hz

Opt 230 207 to 253 VAC, 47 to 63 Hz

Opt 760 Isolation and reversal relays

* **Opt ICM** Rack-mount kit (p/n 5063-9240)

* **Opt AXS** Rack-mount kit side-by-side mounting of two units, Lock-link kit p/n 5061-9694; Flange kit p/n 5062-3974

Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package

Opt 0L2 Extra copy of standard printed documentation package

Opt 0B0 Full documentation on CD-ROM only

Opt 0B3 Service manual

*Support rails required

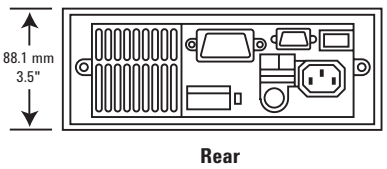
Accessories

Rack-mount and slide for two side-by-side units of different lengths p/n 1494-0015, 5063-9255 and filler panel 5002-3999

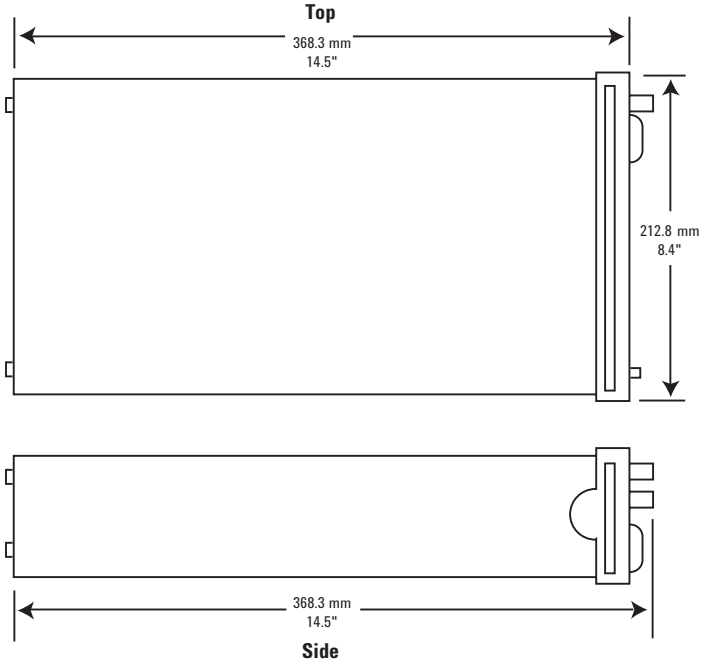
Rack-mount slide and support for one instrument p/n 1494-0015, 5063-9255 and filler panel 5002-3999

E3663AC Support rails for Agilent rack cabinets

Agilent Models: 6611C, 6612C, 6613C, 6614C



Rear



Side

More detailed specifications at **www.agilent.com/find/6610**

Single-Output
80-100 W GPIB

6631B - 6634B

- Fast, low-noise outputs
- Programmable active down-programmer sinks the full rated current
- Dual-range, precision low current measurement
- Optional isolation and polarity reversal relays
- Built-in measurements and advanced programmable features
- Protection features to ensure DUT safety

This series of linear-regulated 80-100 W DC power supplies is designed to maximize the throughput of DUTs through the manufacturing test process. Both programming and measurement are optimized for speed. The active downprogrammer can sink up to the full rated current of the power supply, which quickly brings the power supply output to zero volts. The 6630B series offers many advanced programmable features including stored states and status reporting. Programming is done using industry standard SCPI commands via the GPIB or RS-232. Test system integration is further simplified by using the VXI*Plug&Play* drivers. The optional relays simplify system design and troubleshooting.

The optional front panel binding posts make the 6630B series convenient on the R&D lab bench. The built-in microamp measurement system helps the engineer to easily and accurately monitor the output voltage and current without a complicated test setup.

Specifications (at 0° to 55°C unless otherwise specified)			6631B	6632B	6633B	6634B
Number of outputs			1	1	1	1
GPIB			Yes	Yes	Yes	Yes
Output ratings						
Voltage			0 to 8 V	0 to 20 V	0 to 50 V	0 to 100 V
Current			0 to 10 A	0 to 5 A	0 to 2 A	0 to 1 A
Programming accuracy at 25°C ±5°C						
Voltage			5 mV	10 mV	20 mV	50 mV
+ Current		0.05% +	4 mA	2 mA	1 mA	0.5 mA
Ripple and noise (20 Hz to 20 MHz, with outputs ungrounded or with either terminal grounded)						
Voltage normal mode		rms	0.3 mV	0.3 mV	0.5 mV	0.5 mV
		peak-to-peak	3 mV	3 mV	3 mV	3 mV
Fast mode		rms	1 mV	1 mV	1 mV	2 mV
		peak-to-peak	10 mV	10 mV	15 mV	25 mV
Current		rms	3 mA	2 mA	2 mA	2 mA
DC measurement accuracy via GPIB or front panel meters with respect to actual output at 25°C ±5°C						
Voltage		0.03% +	2 mV	3 mV	6 mV	12 mV
Low current range	–20 mA to +20 mA	0.1% +	2.5 µA	2.5 µA	2.5 µA	2.5 µA
High current range	+20 mA to + rated I	0.2% +	1 mA	0.5 mA	0.25 mA	0.25 mA
	–20 mA to –rated I	0.2% +	1.6 mA	1.1 mA	0.85 mA	0.85 mA
Load regulation						
Voltage			2 mV	2 mV	4 mV	5 mV
Current			2 mA	1 mA	1 mA	1 mA
Line regulation						
Voltage			0.5 mV	0.5 mV	1 mV	1 mV
Current			1 mA	0.5 mA	0.25 mA	0.25 mA

Transient response time Less than 100 µs (50 µs in the fast mode) for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV) following any step change in load current of up to 50% of the output current rating of the supply.

Application notes

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

10 Hints for Using Your Power Supply to Decrease Test Time
5968-6359E

Understanding Linear Power Supply Operation (AN1554)
5989-2291EN

More detailed specifications at **www.agilent.com/find/6630**

Single-Output: 80-100 W GPIB (Continued)

Specifications

(at 0° to 55°C unless otherwise specified)

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC maximum from chassis ground

Remote sensing: Up to two volts dropped in each load lead. Add 2 mV to the voltage load regulation specification for each one volt change in the positive output lead due to load current change.

Command processing time: Average time required for the output voltage to begin to change following receipt of digital data is 4 ms for the power supplies connected directly to the GPIB. (Display disabled).

Output programming response time: The rise and fall time (10/90% and 90/10%) of the output voltage is less than 2 ms (400 µs in fast mode). The output voltage change settles within 1 LSB (0.025% x rated voltage) of final value in less than 6 ms (2 ms in the fast mode).

GPIB interface capabilities: IEEE-488.2, SCPI command set and 6630A Series programming compatability

Software driver: VXI*Plug&Play*

Measurement time: Average time to make a voltage or current measurement is 50 ms.

Input power (full load): 3.5 A, 250 W

Regulatory compliance: Complies with EMC directive 89/336/EEC (ISM 1B).

Size: 425.5 mm W x 88.1 mm H x 364.4 mm D (16.8 in x 3.5 in x 14.3 in).

Weight: Net, 12.7 kg (28 lb) net; 15.0 kg (33 lb) shipping

Warranty: One year

Supplemental Characteristics (Non-warranted characteristics determined by design and useful in applying the product)

	6631B	6632B	6633B	6634B
Average programming resolution				
Voltage	2 mV	5 mV	12.5 mV	25 mV
Current	2.5 mA	1.25 mA	0.5 mA	0.25 mA
Sink current	10 A	5 A	2 A	1 A
Sink current tracking				
SCPI mode	0.4% + 4 mA	0.4% + 2 mA	0.4% + 1 mA	0.4% + 0.5 mA
Compatability mode	-500 mA	-250 mA	-100 mA	-50 mA
Minimum current in constant current mode*	40 mA	20 mA	8 mA	4 mA

*When programming in the 6630A Series language compatibility mode.

Ordering Information

Opt 100 87 to 106 VAC, 47 to 63 Hz

Opt 120 104 to 127 VAC, 47 to 63 Hz

Opt 220 191 to 233 VAC, 47 to 63 Hz

Opt 230 207 to 253 VAC, 47 to 63 Hz

Opt 020 Front-panel binding posts (N/A on 6631B)

Opt 760 Isolation and reversal relays, only available at time of order (N/A on 6631B)

* **Opt 1CM** Rack-mount kit, p/n 5063-9212

* **Opt 1CP** Rack-mount kit with handles, p/n 5063-9219

Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package

Opt 0L2 Extra copy of standard printed documentation package

Opt 0B0 Full documentation on CD-ROM only

Opt 0B3 Service manual

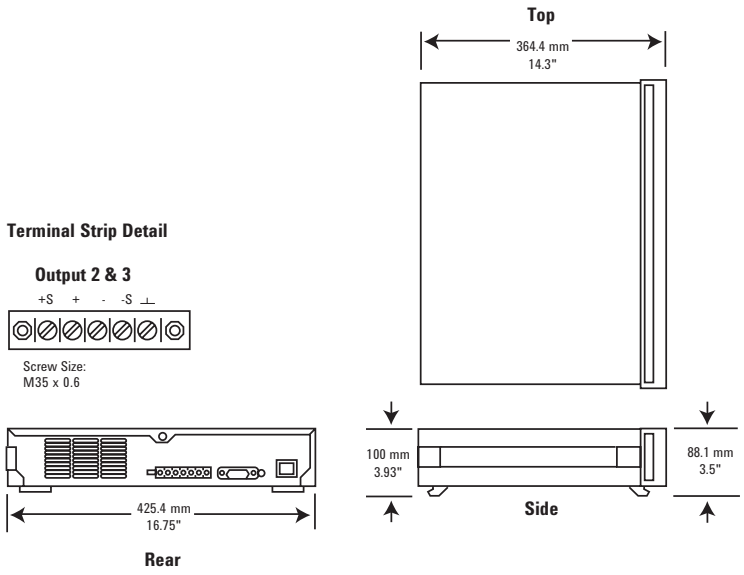
* Support rails required

Accessories

p/n 1494-0060 Rack slide kit

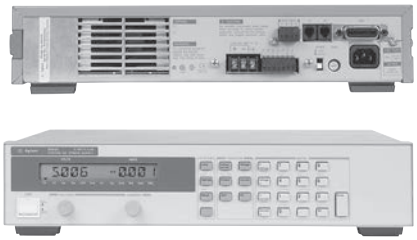
E3663AC Support rails for Agilent rack cabinets

Agilent Models: 6631B, 6632B, 6633B, 6634B



More detailed specifications at **www.agilent.com/find/6630**

Single-Output
200 W



6641A - 6645A

- Fast, low-noise outputs
- Analog control of output voltage and current
- Fan-speed control to minimize acoustic noise
- Parallel and series connections of multiple units
- Built-in measurements and advanced programmable features
- Protection features to ensure DUT safety

This series of 200 W linear-regulated DC power supplies is designed to maximize the throughput of DUTs through the manufacturing test process with fast up and down programming time.

Valuable assemblies can be destroyed by a minor component failure that can allow a surge of voltage or current to flow to the DUT. Fast protection features, including fast crowbar, mode cross-over protection, and the ability to connect the protection circuitry of multiple power supplies can increase production yield.

Programming of the DC output and the protection features can be done either from the front panel or using industry standard SCPI commands, via the GPIB. Using the serial link, up to 16 power supplies can be connected through one GPIB address. Test system integration can be further simplified be using the VXI*Plug&Play* drivers. The output voltage and current can also be controlled with analog signals. This is helpful for certain types of noisy environments, and also immediate reactions to process changes.

Lab bench use is enhanced by the fan speed control, which helps to minimize the acoustic noise.

Specifications (at 0° to 55°C unless otherwise specified)		**6641A**	**6642A**	**6643A**	**6644A**	**6645A**
Number of outputs		1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes
Output ratings						
Output voltage		0 to 8 V	0 to 20 V	0 to 35 V	0 to 60 V	0 to 120 V
Output current (40°C)		0 to 20 A	0 to 10 A	0 to 6 A	0 to 3.5 A	0 to 1.5 A
Maximum current (50°C/55°C)		18 A/17 A	9 A/8.5 A	5.4 A/5.1 A	3.2 A/3 A	1.4 A/1.3 A
Programming accuracy at 25°C ±5°C						
Voltage	0.06% +	5 mV	10 mV	15 mV	26 mV	51 mV
Current	0.15% +	26 mA	13 mA	6.7 mA	4.1 mA	1.7 mA
Ripple and noise from 20 Hz to 20 MHz						
Voltage	rms	300 µV	300 µV	400 µV	500 µV	700 µV
	peak-peak	3 mV	3 mV	4 mV	5 mV	7 mV
Current	rms	10 mA	5 mA	3 mA	1.5 mA	1 mA
Readback accuracy at 25°C ±5°C (percent of reading plus fixed)						
Voltage	0.07% +	6 mV	15 mV	25 mV	40 mV	80 mV
+Current	0.15% +	18 mA	9.1 mA	5 mA	3 mA	1.3 mA
-Current	0.35% +	40 mA	20 mA	12 mA	6.8 mA	2.9 mA
Load regulation						
Voltage		1 mV	2 mV	3 mV	4 mV	5 mV
Current		1 mA	0.5 mA	0.25 mA	0.25 mA	0.25 mA
Line regualtion						
Voltage		0.5 mV	0.5 mV	1 mV	1mV	2 mV
Current		1 mA	0.5 mA	0.25 mA	0.25 mA	0.25 mA

Transient response time Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of rated current

Supplemental Characteristics	(Non-warranted characteristics determined by design and useful in applying the product)				
Average resolution					
Voltage	2 mV	5 mV	10 mV	15 mV	30 mV
Current	6 mA	3 mA	2 mA	1.2 mA	0.5 mA
OVP	13 mV	30 mV	54 mV	93 mV	190 mV
OVP accuracy	160 mV	400 mV	700 mV	1.2 V	2.4 V

More detailed specifications at **www.agilent.com/find/6640**

Single-Output: 200 W GPIB (Continued)

Application notes

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

10 Hints for Using Your Power Supply to Decrease Test Time
5968-6359E

Understanding Linear Power Supply Operation (AN1554)
5989-2291EN

Modern Connectivity - Using USB and LAN I/O Converters (AN 1475-1)
5989-0123EN

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC from chassis ground

Remote sensing: Up to half the rated output voltage can be dropped in each load lead. The drop in the load leads subtracts from the voltage available for the load.

Command processing time: Average time required for the output voltage to begin to change following receipt of digital data is 20 ms for the power supplies connected directly to the GPIB

Output programming response time: The rise and fall time (10/90% and 90/10%) of the output voltage is less than 15 ms. The output voltage change settles within 1 LSB (0.025% x rated voltage) of final value in less than 60 ms.

Down programming: An active down programmer sinks approximately 20% of the rated output current

Modulation: (Analog programming of output voltage and current)
Input Signal: 0 to -5 V
Input Impedance: 10 kΩ nominal

Specifications (at 0° to 55°C unless otherwise specified)		**6641A-J04** Special order option	**6643A-J11** Special order option	**6644A-J09** Special order option	**6645A-J05** Special order option	**6645A-J06** Special order option
Number of outputs		1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes
Output ratings						
Output voltage		13 V	40 V	70 V	150 V	170 V
Output current (40°C)		15.3 A	5 A	3 A	1.2 A	1 A
Maximum current (50°C/55°C)		13.77 A/13 A	4.5 A/4.25 A	2.7 A/2.55 A	1.08 A/1.02 A	0.9 A/0.85 A
Programming accuracy at 25°C ±5°C						
Voltage	0.06% +	8.5 mV	17.5 mV	31 mV	65 mV	74 mV
Current	0.15% +	21 mA	6.7 mA	4.1 mA	1.7 mA	1.7 mA
Ripple and noise						
from 20 Hz to 20 MHz						
Voltage rms		300 µV	450 µV	600 µV	900 µV	1 mV
peak-peak		3 mV	3.5 mV	6 mV	9 mV	10 mV
Current rms		8 mA	3 mA	1.5 mA	1 mA	1 mA
Readback accuracy at 25°C ±5°C (percent of reading plus fixed)						
Voltage	0.07% +	10 mV	30 mV	47 mV	100 mV	140 mV
+Current	0.15% +	15 mA	5 mA	3 mA	1.3 mA	1.3 mA
–Current	0.35% +	40 mA	12 mA	6.8 mA	2.9 mA	2.9 mA
Load regulation						
Voltage		1 mV	3 mV	4.5 mV	7 mV	8 mV
Current		1 mA	0.25 mA	0.25 mA	0.25 mA	0.25 mA
Line regulation						
Voltage		0.5 mV	1 mV	1.5 mV	2.5 mV	3 mV
Current		1 mA	0.25 mA	0.25 mA	0.25 mA	0.25 mA

Transient response time Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of rated current

Supplemental Characteristics	(Non-warranted characteristics determined by design and useful in applying the product)				
Average resolution					
Voltage	3.5 mV	12 mV	1.4 mV	37.5 mV	42.5 mV
Current	5 mA	2 mA	1.2 mA	0.5 mA	0.5 mA
OVP	23 mV	62 mV	110 mV	250 mV	285 mV
OVP accuracy	260 mV	800 mV	1.5 mV	3 V	3.4 V

More detailed specifications at **www.agilent.com/find/6640**

Single-Output: 200 W GPIB (Continued)

AC input: (AC input frequency 47 to 63 Hz)

Voltage	100 VAC	120 VAC	220 VAC	240 VAC
Current	4.4 A	3.8 A	2.2 A	2.0 A

Input power 480 VA, 400 W at full load; 60 W at no load

GPIB interface capabilities SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, E1, and C0. IEEE-488.2 and SCPI-compatible command set

Software driver:
- IVI-COM
- VXI*Plug&Play*

Regulatory compliance: Complies with UL 3111-1, IEC 61010-1.

Size: 425.5 mm W x 88.1 mm H x 439 mm D (16.75 in x 3.5 in x 17.3 in)

Weight: Net, 14.2 kg (31.4 lb); shipping, 16.3 kg (36 lb)

Warranty: One year

Ordering information

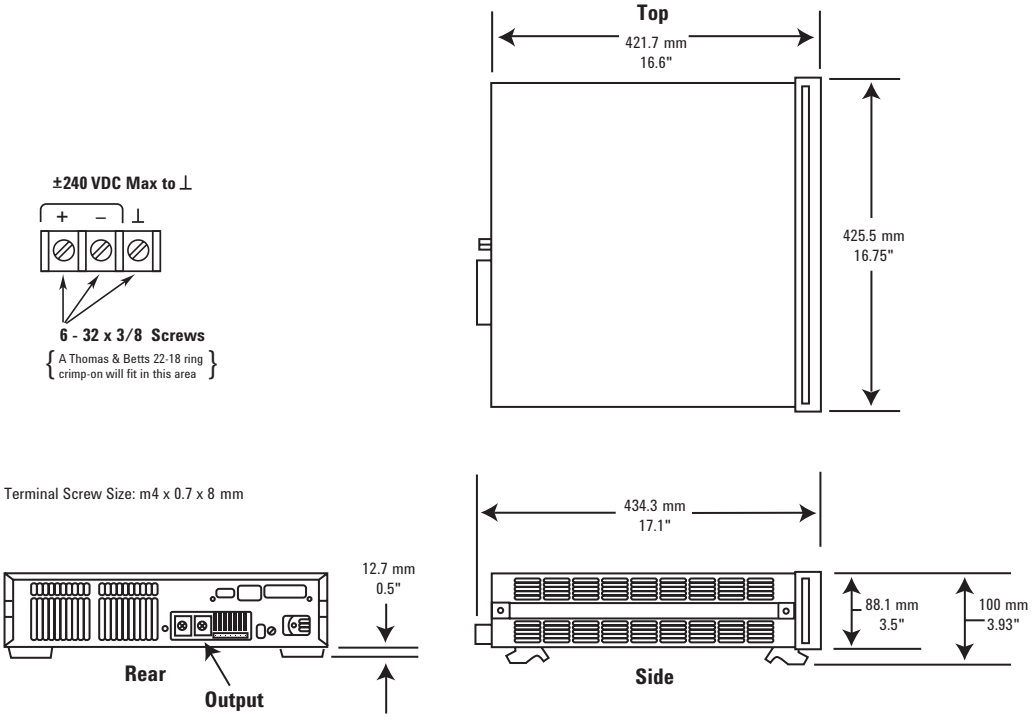
Opt 100 87 to 106 VAC, 47 to 63 Hz
Opt 120 104 to 127 VAC, 47 to 63 Hz
Opt 220 191 to 233 VAC, 47 to 63 Hz
Opt 240 209 to 250 VAC, 47 to 63 Hz
* **Opt 908** Rack-mount kit (p/n 5063-9212)
* **Opt 909** Rack-mount kit with handles (p/n 5063-9219)
Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual

* Support rails required

Accessories

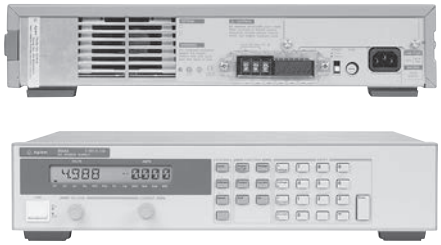
p/n 1494-0060 Accessory slide kit
p/n 1252-3698 7-pin analog plug
p/n 1252-1488 4-pin digital plug
p/n 5080-2148 Serial link cable 2 m (6.6 ft)
E3663AC Support rails for Agilent rack cabinets

Agilent Models: 6641A, 6642A, 6643A, 6644A, 6645A



More detailed specifications at **www.agilent.com/find/6640**

Single-Output
200 W



6541A-6545A

Front panel and analog control of output voltage and current
Fast, low-noise outputs
Fan-speed control to minimize acoustic noise
Protection features to ensure DUT safety

This reliable series of 200 W DC power supplies can be controlled either from the front panel or via an analog programming voltage. When used in a test system, the fast up and down programming helps decrease test time. Quickly reacting protection features, including fast crowbar, CV/CC mode crossover and over-voltage protection help protect your valuable assemblies from damage. The linear topology produces very low ripple and noise, which allows you to make extremely accurate measurements of the devices which you are testing.

Lab bench use is enhanced by the fan speed control, which helps to minimize the acoustic noise.

Specifications (at 0° to 55°C unless otherwise specified)		6541A	6542A	6543A	6544A	6545A
Number of outputs		1	1	1	1	1
GPIB		No	No	No	No	No
Output ratings						
Output voltage		0 to 8 V	0 to 20 V	0 to 35 V	0 to 60 V	0 to 120 V
Output current (40°C)		0 to 20 A	0 to 10 A	0 to 6 A	0 to 3.5 A	0 to 1.5 A
Maximum current (50°C/55°C)		18 A/17 A	9 A/8.5 A	5.4 A/5.1 A	3.2 A/3 A	1.4 A/1.3 A
Programming accuracy	at 25°C ±5°C					
Voltage	0.06% +	5 mV	10 mV	15 mV	26 mV	51 mV
Current	0.14% +	26 mA	13 mA	6.7 mA	4.1 mA	1.7 mA
Ripple and noise						
from 20 Hz to 20 MHz						
Voltage rms		300 µV	300 µV	400 µV	500 µV	700 µV
peak-peak		3 mV	3 mV	4 mV	5 mV	7 mV
Current rms		10 mA	5 mA	3 mA	1.5 mA	1 mA
Load regulation						
Voltage		1 mV	2 mV	3 mV	4 mV	5 mV
Current		1 mA	0.5 mA	0.25 mA	0.25 mA	0.25 mA
Line regulation						
Voltage		0.5 mV	0.5 mV	1 mV	1mV	2 mV
Current		1 mA	0.5 mA	0.25 mA	0.25 mA	0.25 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of rated current				
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)				
Average resolution						
Voltage		2 mV	5 mV	10 mV	15 mV	30 mV
Current		6 mA	3 mA	2 mA	1.2 mA	0.5 mA
OVP		13 mV	30 mV	54 mV	93 mV	190 mV
OVP accuracy		160 mV	400 mV	700 mV	1.2 V	2.4 V

More detailed specifications at **www.agilent.com/find/6540**

Single-Output: 200 W (Continued)

Application notes

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

Understanding Linear Power Supply Operation (AN1554)
5989-2291EN

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC from chassis ground

Remote sensing: Up to half the rated output voltage can be dropped in each load lead. The drop in the load leads subtracts from the voltage available for the load.

Output programming response time: The rise and fall time (10/90% and 90/10%) of the output voltage is less than 15 ms. The output voltage change settles within 1 LSB (0.025% x rated voltage) of final value in less than 60 ms.

Down programming: An active down programmer sinks approximately 20% of the rated output current

Modulation: (Analog programming of output voltage and current)
Input Signal: 0 to -5 V
Input Impedance: 10 kΩ nominal

AC input: (AC input frequency 47 to 63 Hz)

Voltage	100 VAC	120 VAC	220 VAC	240 VAC
Current	4.4 A	3.8 A	2.2 A	2.0 A

Input power: 480 VA, 400 W at full load; 60 W at no load

Regulatory compliance: Conforms to UL1244 and IEC 61010-1.

Size: 425.5 mm W x 88.1 mm H x 439 mm D (16.75 in x 3.5 in x 17.3 in)

Weight: Net, 14.2 kg (31.4 lb); shipping, 16.3 kg (36 lb)

Warranty: One year

Specifications (at 0° to 55°C unless otherwise specified)		**6541A-J04** Special order option	**6544A-J09** Special order option	**6545A-J05** Special order option
Number of outputs		1	1	1
GPIB		No	No	No
Output ratings				
Output voltage		13 V	70 V	150 V
Output current (40°C)		15.3 A	3 A	1.2 A
Maximum current (50°C/55°C)		13.77 A/13 A	2.7 A/2.55 A	1.08 A/1.02 A
Programming accuracy at 25°C ±5°C				
Voltage	0.06% +	8.5 mV	31 mV	65 mV
Current	0.15% +	21 mA	4.1 mA	1.7 mA
Ripple and noise				
from 20 Hz to 20 MHz				
Voltage rms		300 µV	600 µV	900 µV
peak-peak		3 mV	6 mV	9 mV
Current rms		8 mA	1.5 mA	1 mA
Load regulation				
Voltage		1 mV	4.5 mV	7 mV
Current		1 mA	0.25 mA	0.25 mA
Line regulation				
Voltage		0.5 mV	1.5 mV	2.5 mV
Current		1 mA	0.25 mA	0.25 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of rated current		
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)		
Average resolution				
Voltage		3.5 mV	1.4 mV	37.5 mV
Current		5 mA	1.2 mA	0.5 mA
OVP		23 mV	110 mV	250 mV
OVP accuracy		260 mV	1.5 mV	3 V

More detailed specifications at **www.agilent.com/find/6540**

Single-Output: 200 W (Continued)

Ordering information

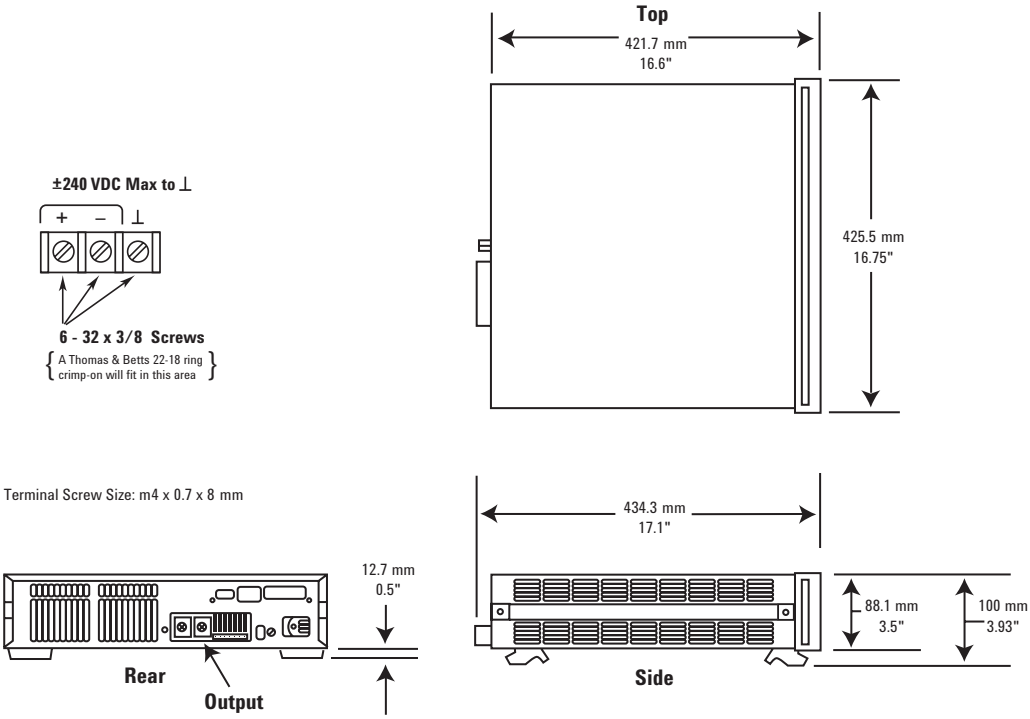
Opt 100 87 to 106 VAC, 47 to 63 Hz
Opt 120 104 to 127 VAC, 47 to 63 Hz
Opt 220 191 to 233 VAC, 47 to 63 Hz
Opt 240 209 to 250 VAC, 47 to 63 Hz
* **Opt 908** Rack-mount kit (p/n 5063-9212)
* **Opt 909** Rack-mount kit w/handles (p/n 5063-9219)
Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual

* Support rails required

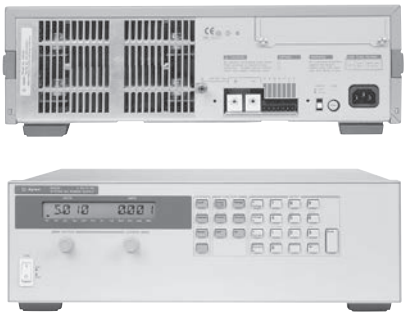
Accessories

p/n 1494-0060 Accessory slide kit
E3663AC Support rails for Agilent rack cabinets

Agilent Models: 6541A, 6542A, 6543A, 6544A, 6545A



More detailed specifications at **www.agilent.com/find/6540**



6651A-6655A

Single-Output
500 W GPIB

Fast, low-noise outputs
Analog control of output voltage and current
Fan-speed control to minimize acoustic noise
Built-in measurements and advanced programmable features
Protection features to ensure DUT safety

This series of 500 W linear-regulated DC power supplies is designed to maximize the throughput of DUTs through the manufacturing test process with fast up and down programming time.

Valuable assemblies can be destroyed by a minor component failure that causes a surge of current to flow into the DUT. Fast protection features, including fast crowbar, mode crossover protection, and the ability to connect the protection circuitry of multiple power supplies can increase production yield.

Programming of the DC output and the protection features can be done either from the front panel or using industry standard SCPI commands, via the GPIB. Using the serial link, up to 16 power supplies can be connected through one GPIB address. Test system integration can be further simplified be using the VXI*Plug&Play* drivers. The output voltage and current can also be controlled with analog signals. This is helpful for certain types of noisy environments, and also immediate reactions to process changes.

Lab bench use is enhanced by the fan speed control, which helps to minimize the acoustic noise.

Specifications (at 0° to 55°C unless otherwise specified)		6651A	6652A	6653A	6654A	6655A	6651A-J01 Special order option
Number of outputs		1	1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes	Yes
Output ratings							
Output voltage		0 to 8 V	0 to 20 V	0 to 35 V	0 to 60 V	0 to 120 V	10 V
Output current (40°C)		0 to 50 A	0 to 25 A	0 to 15 A	0 to 9 A	0 to 4 A	50 A
Maximum current (50°C/55°C)		45 A/42.5 A	22.5 A/21.3 A	13.5 A/12.8 A	8.1 A/7.7 A	3.6 A/3.4 A	45 A/42.5 A
Programming accuracy at 25°C ±5°C							
Voltage	0.06% +	5 mV	10 mV	15 mV	26 mV	51 mV	6 mV
Current	0.15% +	60 mA	25 mA	13 mA	8 mA	4 mA	60 mA
Ripple and noise							
from 20 Hz to 20 MHz							
Voltage rms		300 µV	300 µV	400 µV	500 µV	700 µV	300 µV
peak-peak		3 mV	3 mV	4 mV	5 mV	7 mV	3 mV
Current rms		25 mA	10 mA	5 mA	3 mA	2 mA	25 mA
Readback accuracy at 25°C ±5°C (percent of reading plus fixed) System models only							
Voltage	0.07% +	6 mV	15 mV	25 mV	40 mV	80 mV	7.5 mV
+Current	0.15% +	67 mA	26 mA	15 mA	7 mA	3 mA	67 mA
–Current	0.35% +	100 mA	44 mA	24 mA	15 mA	7 mA	100 mA
Load regulation							
Voltage		1 mV	2 mV	3 mV	4 mV	5 mV	1 mV
Current		2 mA	1 mA	0.5 mA	0.5 mA	0.5 mA	2 mA
Line regulation							
Voltage		0.5 mV	0.5 mV	1 mV	1 mV	2 mV	0.5 mV
Current		2 mA	1 mA	0.75 mA	0.5 mA	0.5 mA	2 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of rated current					
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)					
Average resolution							
Voltage		2 mV	5 mV	10 mV	15 mV	30 mV	2.5 mV
Current		15 mA	7 mA	4 mA	2.5 mA	1.25 mA	15 mA
OVP		12 mV	30 mV	54 mV	93 mV	190 mV	16 mV
OVP accuracy		160 mV	400 mV	700 mV	1.2 V	2.4 V	200 mV

More detailed specifications at **www.agilent.com/find/6650**

Single-Output: 500 W GPIB (Continued)

Application notes

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

10 Hints for Using Your Power Supply to Decrease Test Time
5968-6359E

Understanding Linear Power Supply Operation
(AN1554)
5989-2291EN

Modern Connectivity - Using USB and LAN I/O Converters
(AN 1475-1)
5989-0123EN

Agilent DC Power Supplies for Base Station Testing
5988-2386EN

Specifications (at 0° to 55°C unless otherwise specified)		**6651A-J03** Special order option	**6651A-J09** Special order option	**6652A-J03** Special order option	**6653A-J04** Special order option	**6653A-J17** Special order option
Number of outputs		1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes
Output ratings						
Output voltage		6 V	17 V/20 V	27 V	40 V	30 V
Output current (40°C)		60 A	30 A/15 A	18.5 A	12.5 A	17.5 A
Maximum current (50°C/55°C)		54 A/51 A	27 A/25.5 A 13.5 A/12.75 A	16.65 A/15.72 A	11.25 A/10.6 A	15.75 A/14.87 A
Programming accuracy at 25°C ±5°C						
Voltage	0.06% +	5 mV	10 mV	13.5 mV	17.5 mV	15 mV
Current	0.15% +	75 mA	36 mA	25 mA	13 mA	16 mA
Ripple and noise						
from 20 Hz to 20 MHz						
Voltage rms		300 µV	300 µV	450 µV	1.6 mV	400 µV
peak-peak		3 mV	4 mV	4.5 mV	5 mV	4 mV
Current rms		30 mA	13 mA	10 mA	5 mA	6 mA
Readback accuracy at 25°C ±5°C (percent of reading plus fixed) System models only						
Voltage	0.07% +	6 mV	15 mV	20.5 mV	30 mV	25 mV
+Current	0.15% +	80 mA	40 mA	26 mA	15 mA	18 mA
–Current	0.35% +	150 mA	55 mA	44 mA	24 mA	28 mA
Load regulation						
Voltage		1 mV	2 mV	2 mV	3.5 mV	3 mV
Current		6.5 mA	2 mA	1 mA	1 mA	0.5 mA
Line regulation						
Voltage		0.5 mV	0.5 mV	0.5 mV	1 mV	1 mV
Current		2 mA	2 mA	2 mA	0.75 mA	0.75 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of rated current				
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)				
Average resolution						
Voltage		2 mV	5 mV	6.75 mV	12 mV	10 mV
Current		18 mA	9 mA	7 mA	4 mA	5 mA
OVP		12 mV	30 mV	30 mV	65 mV	54 mV
OVP accuracy		160 mV	500 mV	400 mV	750 mV	700 mV

More detailed specifications at **www.agilent.com/find/6650**

Single-Output: 500 W GPIB (Continued)

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC from chassis ground

Remote sensing: Up to half the rated output voltage can be dropped in each load lead. The drop in the load leads subtracts from the voltage available for the load.

Command processing time: Average time required for the output voltage to begin to change following receipt of digital data is 20 ms for the power supplies connected directly to the GPIB

Output programming response time: The rise and fall time (10/90% and 90/10%) of the output voltage is less than 15 ms. The output voltage change settles within 1 LSB (0.025% x rated voltage) of final value in less than 60 ms.

Down programming: An active down programmer sinks approximately 20% of the rated output current

Modulation: (Analog programming of output voltage and current)
Input signal: 0 to -5 V
Input impedance: 10 kΩ nominal

AC input: (AC input frequency 47 to 63 Hz)

Voltage	100 VAC	120 VAC	220 VAC	240 VAC
Current	12 A	10 A	5.7 A	5.3 A

Input power: 1,380 VA, 1,100 W at full load; 120 W at no load

GPIB interface capabilities: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, E1, and C0. IEEE-488.2 and SCPI-compatible command set.

Software driver:
- IVI-COM
- VXI*Plug&Play*

Regulatory compliance: Listed to UL 1244; conforms to IEC 61010-1.

Size: 425.5 mm W x 132.6 mm H x 497.8 mm D (16.75 in x 5.22 in x 19.6 in)

Weight: Net, 25 kg (54 lb); shipping, 28 kg (61 lb)

Warranty: One year

Specifications (at 0° to 55°C unless otherwise specified)		**6654A-J04** Special order option	**6654A-J05** Special order option	**6654A-J12** Special order option	**6655A-J05** Special order option	**6655A-J10** Special order option
Number of outputs		1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes
Output ratings						
Output voltage		70 V	50 V	80 V	150 V	156 V
Output current (40°C)		7.5 A	10 A	6 A	3.2 A	3 A
Maximum current (50°C/55°C)		6.75 A/6.37 A	9 A/8.5 A	5.4 A/5.1 A	2.88 A/2.72 A	2.7 A/2.55 A
Programming accuracy at 25°C ±5°C						
Voltage	0.06% +	30 mV	26 mV	35 mV	64 mV	71 mV
Current	0.15% +	7 mA	9 mA	7 mA	3.5 mA	4 mA
Ripple and noise from 20 Hz to 20 MHz						
Voltage rms		600 µV	500 µV	700 µV	800 µV	900 µV
peak-peak		6 mV	5 mV	7 mV	8 mV	8 mV
Current rms		5 mA	4 mA	3 mA	2 mA	3 mA
Readback accuracy at 25°C ±5°C (percent of reading plus fixed) System models only						
Voltage	0.07% +	50 mV	40 mV	58 mV	100 mV	110 mV
+Current	0.15% +	6 mA	8 mA	6 mA	2.5 mA	3 mA
–Current	0.35% +	13 mA	17 mA	16 mA	6.5 mA	7.5 mA
Load regulation						
Voltage		4 mV	4 mV	4 mV	6 mV	7 mV
Current		0.5 mA	0.5 mA	0.5 mA	0.5 mA	1 mA
Line regulation						
Voltage		1 mV	1 mV	4.5 mV	2 mV	2 mV
Current		0.5 mA	0.5 mA	0.5 mA	0.5 mA	1 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of rated current				
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)				
Average resolution						
Voltage		17.5 mV	15 mV	20 mV	37.5 mV	39.5 mV
Current		1.9 mA	2.75 mA	1.7 mA	8 mA	8 mA
OVP		110 mV	93 mV	130 mV	240 mV	250 mV
OVP accuracy		1.4 V	1.2 V	1.6 V	3 V	3.3 V

More detailed specifications at **www.agilent.com/find/6650**

Single-Output: 500 W GPIB (Continued)

Ordering information

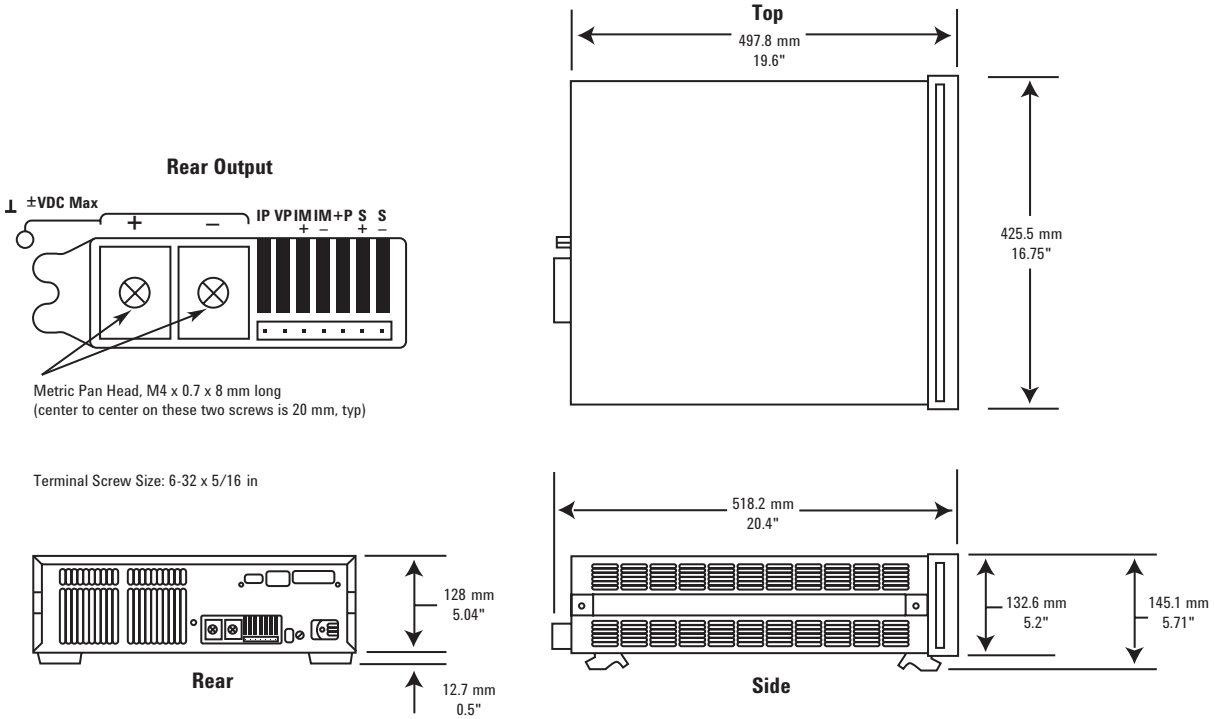
Opt 100 87 to 106 VAC, 47 to 63 Hz
Opt 120 104 to 127 VAC, 47 to 63 Hz
Opt 220 191 to 233 VAC, 47 to 63 Hz
Opt 240 209 to 250 VAC, 47 to 63 Hz
* **Opt 908** Rack-mount kit (p/n 5062-3977)
* **Opt 909** Rack-mount kit w/handles (p/n 5063-9221)
Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual

* Support rails required

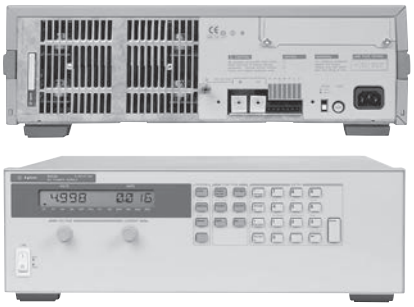
Accessories

p/n 1494-0059 Accessory slide kit
p/n 1252-3698 7-pin analog plug
p/n 1252-1488 4-pin digital plug
p/n 5080-2148 Serial link cable 2 m (6.6 ft)
E3663AC Support rails for Agilent rack cabinets

Agilent Models: 6651A, 6652A, 6653A, 6654A, 6655A



More detailed specifications at **www.agilent.com/find/6650**



6551A-6555A

Single-Output
500 W

Front panel and analog control of output voltage and current
Fast, low-noise outputs
Fan-speed control to minimize acoustic noise
Protection features to ensure DUT safety

This reliable series of 500 W DC power supplies can be controlled either from the front panel or via an analog programming voltage. When used in a test system, the fast up and down programming helps decrease test time. Quickly reacting protection features, including fast crowbar, CV/CC mode crossover and over-voltage protection help protect your valuable assemblies from damage. The linear topology produces very low ripple and noise, which allows you to make extremely accurate measurements of the devices which you are testing.

Lab bench use is enhanced by the fan speed control, which helps to minimize the acoustic noise.

Specifications (at 0° to 55°C unless otherwise specified)		6551A	6552A	6553A	6554A	6555A
Number of outputs		1	1	1	1	1
GPIB		No	No	No	No	No
Output ratings						
Output voltage		0 to 8 V	0 to 20 V	0 to 35 V	0 to 60 V	0 to 120 V
Output current (40°C)		0 to 50 A	0 to 25 A	0 to 15 A	0 to 9 A	0 to 4 A
Maximum current (50°C/55°C)		45 A/42.5 A	22.5 A/21.3 A	13.5 A/12.8 A	8.1 A/7.7 A	3.6 A/3.4 A
Programming accuracy at 25°C ±5°C						
Voltage	0.06% +	5 mV	10 mV	15 mV	26 mV	51 mV
Current	0.15% +	60 mA	25 mA	13 mA	8 mA	4 mA
Ripple and noise from 20 Hz to 20 MHz						
Voltage rms		300 µV	300 µV	400 µV	500 µV	700 µV
peak-peak		3 mV	3 mV	4 mV	5 mV	7 mV
Current rms		25 mA	10 mA	5 mA	3 mA	2 mA
Load regulation						
Voltage		1 mV	2 mV	3 mV	4 mV	5 mV
Current		2 mA	1 mA	0.5 mA	0.5 mA	0.5 mA
Line regulation						
Voltage		0.5 mV	0.5 mV	1 mV	1 mV	2 mV
Current		2 mA	1 mA	0.75 mA	0.5 mA	0.5 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of rated current				
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)				
Average resolution						
Voltage		2 mV	5 mV	10 mV	15 mV	30 mV
Current		15 mA	7 mA	4 mA	2.5 mA	1.25 mA
OVP		12 mV	30 mV	54 mV	93 mV	190 mV
OVP accuracy		160 mV	400 mV	700 mV	1.2 V	2.4 V

More detailed specifications at **www.agilent.com/find/6550**

Single-Output: 500 W (Continued)

Application notes

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

Understanding Linear Power Supply Operation
(AN1554)
5989-2291EN

Agilent DC Power Supplies for Base Station Testing
5988-2386EN

Specifications (at 0° to 55°C unless otherwise specified)		**6551A-J01** Special order option	**6551A-J03** Special order option	**6553A-J04** Special order option	**6553A-J17** Special order option
Number of outputs		1	1	1	1
GPIB		No	No	No	No
Output ratings					
Output voltage		10 V	6 V	40 V	30 V
Output current (40°C)		50 A	60 A	12.5 A	17.5 A
Maximum current (50°C/55°C)		45 A/42.5 A	54 A/51 A	11.25 A/10.6 A	15.75 A/14.87 A
Programming accuracy at 25°C ±5°C					
Voltage	0.06% +	6 mV	5 mV	17.5 mV	15 mV
Current	0.15% +	60 mA	75 mA	13 mA	16 mA
Ripple and noise from 20 Hz to 20 MHz					
Voltage rms		300 µV	300 µV	1.6 mV	400 µV
peak-peak		3 mV	3 mV	5 mV	4 mV
Current rms		25 mA	30 mA	5 mA	6 mA
Load regulation					
Voltage		1 mV	1 mV	3.5 mV	3 mV
Current		2 mA	6.5 mA	1 mA	0.5 mA
Line regulation					
Voltage		0.5 mV	0.5 mV	1 mV	1 mV
Current		2 mA	2 mA	0.75 mA	0.75 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of rated current			
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)			
Average resolution					
Voltage		2.5 mV	2 mV	12 mV	10 mV
Current		15 mA	18 mA	4 mA	5 mA
OVP		16 mV	12 mV	65 mV	54 mV
OVP accuracy		200 mV	160 mV	750 mV	700 mV

More detailed specifications at **www.agilent.com/find/6550**

Single-Output: 500 W (Continued)

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC from chassis ground

Remote sensing: Up to half the rated output voltage can be dropped in each load lead. The drop in the load leads subtracts from the voltage available for the load.

Output programming response time: The rise and fall time (10/90% and 90/10%) of the output voltage is less than 15 ms. The output voltage change settles within 1 LSB (0.025% x rated voltage) of final value in less than 60 ms.

Down programming: An active down programmer sinks approximately 20% of the rated output current

Modulation: (Analog programming of output voltage and current)
Input signal: 0 to -5 V
Input impedance: 10 kΩ nominal

AC input: (AC input frequency 47 to 63 Hz)

Voltage	100 VAC	120 VAC	220 VAC	240 VAC
Current	12 A	10 A	5.7 A	5.3 A

Input power: 1,380 VA, 1,100 W at full load; 120 W at no load

Regulatory compliance: Listed to UL 1244; certified to CSA556B; conforms to IEC 61010-1.

Size: 425.5 mm W x 132.6 mm H x 497.8 mm D (16.75 in x 5.22 in x 19.6 in)

Weight: Net, 25 kg (54 lb); shipping, 28 kg (61 lb)

Warranty: One year

Specifications (at 0° to 55°C unless otherwise specified)		**6554A-J04** Special order option	**6554A-J05** Special order option	**6554A-J12** Special order option	**6555A-J10** Special order option
Number of outputs		1	1	1	1
GPIB		No	No	No	No
Output ratings					
Output voltage		70 V	50 V	80 V	156 V
Output current (40°C)		7.5 A	10 A	6 A	3 A
Maximum current (50°C/55°C)		6.75 A/6.37 A	9 A/8.5 A	5.4 A/5.1 A	2.7 A/2.55 A
Programming accuracy at 25°C ±5°C					
Voltage	0.06% +	38 mV	26 mV	35 mV	71 mV
Current	0.15% +	7 mA	9 mA	7 mA	4 mA
Ripple and noise from 20 Hz to 20 MHz					
Voltage rms		600 µV	500 µV	700 µV	900 µV
peak-peak		6 mV	5 mV	5 mV	8 mV
Current rms		5 mA	4 mA	3 mA	3 mA
Load regulation					
Voltage		4 mV	4 mV	4 mV	7 mV
Current		0.5 mA	0.5 mA	0.5 mA	1 mA
Line regulation					
Voltage		1 mV	1 mV	4.5 mV	2 mV
Current		0.5 mA	0.5 mA	0.5 mA	1 mA
Transient response time		Less than 100 µs for the output voltage to recover to its previous level (within 0.1% of the voltage rating of the supply or 20 mV, whichever is greater) following any step change in load current of up to 50% of rated current			
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)			
Average resolution					
Voltage		17.5 mV	15 mV	20 mV	39.5 mV
Current		1.9 mA	2.75 mA	1.7 mA	8 mA
OVP		110 mV	93 mV	130 mV	250 mV
OVP accuracy		1.4 V	1.2 V	1.6 V	3.3 V

More detailed specifications at **www.agilent.com/find/6550**

Single-Output: 500 W (Continued)

Ordering Information

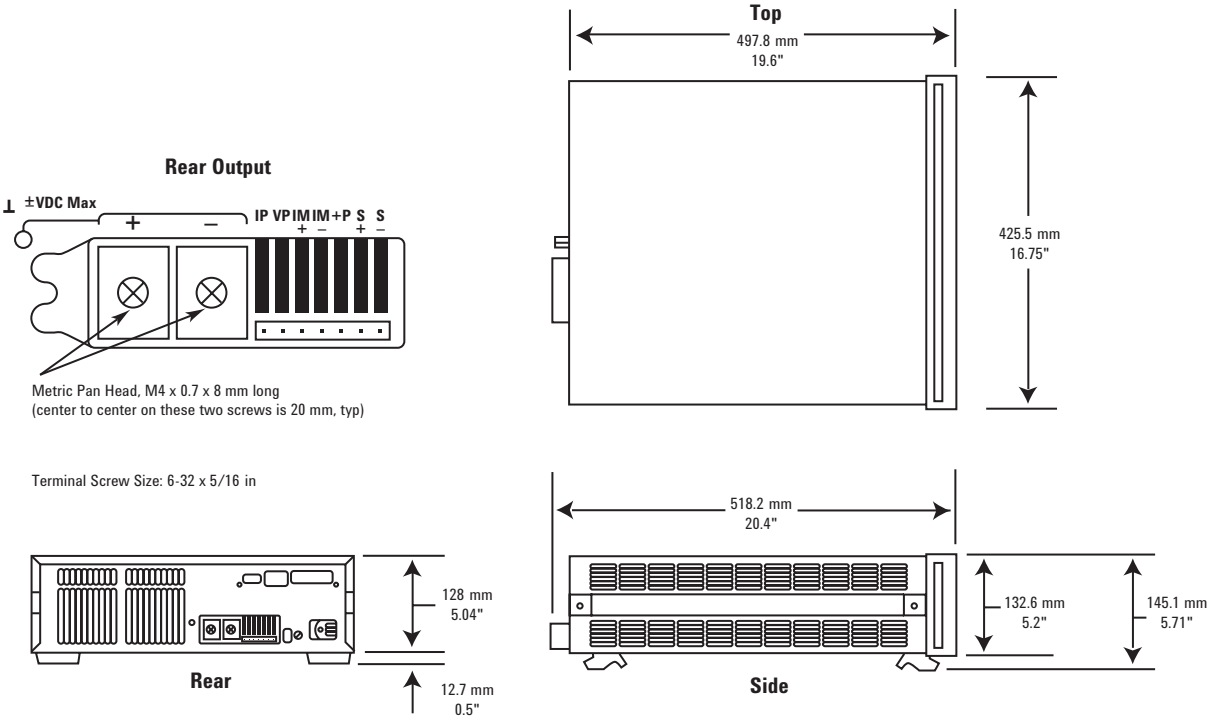
Opt 100 87 to 106 VAC, 47 to 63 Hz
Opt 120 104 to 127 VAC, 47 to 63 Hz
Opt 220 191 to 233 VAC, 47 to 63 Hz
Opt 240 209 to 250 VAC, 47 to 63 Hz
* **Opt 908** Rack-mount kit (p/n 5062-3977)
* **Opt 909** Rack-mount kit w/handles (p/n 5063-9221)
Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual

* Support rails required

Accessories

p/n 1494-0059 Accessory slide kit
E3663AC Support rails for Agilent rack cabinets

Agilent Models: 6551A, 6552A, 6553A, 6554A, 6555A



More detailed specifications at **www.agilent.com/find/6550**

6671A - 6675A

Single-Output
2000 W GPIB

- Fast, low-noise outputs
- Analog control of output voltage and current
- Fan-speed control to minimize acoustic noise
- Built-in measurements and advanced programmable features
- Protection features to ensure DUT safety

This series of 2000 watt DC power supplies has the exceptional, proven reliability that test system engineers look for. It also has the unusual combination of high efficiency and low noise operation.

Programming of the DC output and the extensive protection features can be done either from the front panel or using industry standard SCPI commands, via the GPIB. Using the serial link, up to 16 power supplies can be connected through one GPIB address. Test system integration can be further simplified be using the VXI*Plug&Play* drivers. The output voltage and current can also be controlled with analog signals. This is helpful for certain types of noisy environments, and also immediate reactions to process changes.

Lab-bench use is enhanced by the fan-speed control, which minimizes acoustic noise. The extremely low ripple and noise helps the built-in measurement system make extremely accurate current and voltage measurements.

Specifications (at 0° to 55°C unless otherwise specified)		**6671A**	**6672A**	**6673A**	**6674A**	**6675A**
Number of outputs		1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes
Output ratings						
Output voltage		0 to 8 V	0 to 20 V	0 to 35 V	0 to 60 V	0 to 120 V
Output current		0 to 220 A	0 to 100 A	0 to 60 A	0 to 35 A	0 to 18 A
Programming accuracy at 25°C ±5°C						
Voltage	0.04% +	8 mV	20 mV	35 mV	60 mV	120 mV
Current	0.1% +	125 mA	60 mA	40 mA	25 mA	12 mA
Ripple and noise						
from 20 Hz to 20 MHz						
Voltage rms		650 µV	750 µV	800 µV	1.25 mV	1.9 mV
Voltage peak to peak		7 mV	9 mV	9 mV	11 mV	16 mV
Current rms		200 mA	100 mA	40 mA	25 mA	12 mA
Readback accuracy at 25°C ±5°C (percent of reading plus fixed)						
Voltage	0.05% +	12 mV	30 mV	50 mV	90 mV	180 mV
±Current	0.1% +	150 mA	100 mA	60 mA	35 mA	18 mA
Load and line regulation						
Voltage	0.002%+	300 µV	650 µV	1.2 mV	2 mV	4 mV
Current	0.005%+	10 mA	7 mA	4 mA	2 mA	1 mA
Transient response time		Less than 900 µs for the output voltage to recover 100 mV following a change in load from 100% to 50% or 50% to 100% of the output current rating of the supply				
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)				
Average resolution						
Voltage		2 mV	5 mV	10 mV	15 mV	30 mV
Current		55 mA	25 mA	15 mA	8.75 mA	4.5 mA
OVP		15 mV	35 mV	65 mV	100 mV	215 mV
Output Voltage programming response time*						
(excluding command processing time)		30 ms	60 ms	130 ms	130 ms	195 ms

* Full load programming rise/fall time (10% to 90% or 90% to 10%) with full resistive load equal to rated output voltage/rated output current.

More detailed specifications at **www.agilent.com/find/6670**

Single-Output: 2000 W GPIB (Continued)

Application notes

6671A/72A/81A/82A/90A System DC Power Supplies Product Overview
5988-3050EN

Agilent DC Power Supplies for Base Station Testing
5988-2386EN

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

Specifications (at 0° to 55°C unless otherwise specified)		**6671A-J03** Special order option	**6671A-J04** Special order option	**6671A-J08** Special order option	**6671A-J17** Special order option	**6672A-J04** Special order option	**6673A-J03** Special order option
Number of outputs		1	1	1	1	1	1
GPIB		Yes	Yes	Yes	Yes	Yes	Yes
Output ratings							
Output voltage		14 V	10 V	3 V	15 V	24 V	37.5 V
Output current		150 A	200 A	300 A	120 A	85 A	45 A
Programming accuracy at 25°C ±5°C							
Voltage	0.04%+	14 mV	10 mV	4 mV	15 mV	25 mV	37.5 mV
Current	0.1%+	90 mA	125 mA	250 mA	90 mA	60 mA	40 mA
Ripple and noise							
from 20 Hz to 20 MHz							
Voltage rms		1.5 mV	750 µV	1 mV	1.5 mV	1 mV	800 µV
Voltage peak to peak		15 mV	9 mV	25 mV	15 mV	11 mV	9 mV
Current rms		150 mA	200 mA	275 mA	150 mA	100 mA	40 mA
Readback accuracy at 25°C ±5°C (percent of reading plus fixed) System models only							
Voltage	0.05% +	25 mV	15 mV	6 mV	27 mV	40 mV	53.5 mV
±Current	0.1% +	110 mA	150 mA	250 mA	110 mA	100 mA	60 mA
Load and line regulation							
Voltage	0.002%+	600 µV	300 µV	300 µV	650 µV	650 µV	1.2 mV
Current	0.005%+	7 mA	10 mA	15 mA	7 mA	7 mA	4 mA
Transient response time		Less than 900 µs for the output voltage to recover 100 mV following a change in load from 100% to 50% or 50% to 100% of the output current rating of the supply					
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)					
Average resolution							
Voltage		4 mV	2.5 mV	1 mV	4 mV	6 mV	10 mV
Current		40 mA	55 mA	75 mA	35 mA	22 mA	15 mA
OVP		28 mV	20 mV	8 mV	30 mV	42 mV	65 mV
Output voltage programming response time*							
(excluding command programming processing time)		30 ms	35 ms	30 ms	35 ms	70 ms	130 ms

* Full load programming rise/fall time (10% to 90% or 90% to 10%) with full resistive load equal to rated output voltage/rated output current.

More detailed specifications at **www.agilent.com/find/6670**

Single-Output: 2000 W GPIB (Continued)

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC from chassis ground

Output common-mode noise current: (to signal ground binding post) 500 µArms, 4 mA peak-to-peak

Remote sensing: Up to half the rated output voltage can be dropped in each load lead. The drop in the load leads subtracts from the voltage available for the load.

Command processing time: Average time required for the output voltage to begin to change following receipt of digital data is 20 ms for the power supplies connected directly to the GPIB.

Modulation: (Analog programming of output voltage and current)
- **Input signal:** 0 to -4 V for voltage, 0 to 7 V for current
- **Input impedance:** 60 kΩ or greater

Input power: 3,800 VA, 2,600 W at full load; 170 W at no load

GPIB interface capabilities: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, E1, and C0. IEEE-488.2 and SCPI-compatible command set

Software driver:
- IVI-COM
- VXI*Plug&Play*

Regulatory compliance: Listed to UL1244; certified to CSA556B; conforms to IEC 61010-1.

Size: 425.5 mm W x 132.6 mm H x 640 mm D (16.75 in x 5.22 in x 25.2 in)

Weight: Net, 28.2 kg (62 lbs); shipping, 31.8 kg (70 lbs)

Warranty: One year

Specifications (at 0° to 55°C unless otherwise specified)	**6673A-J08** Special order option	**6674A-J03** Special order option	**6674A-J07** Special order option	**6675A-J04** Special order option	**6675A-J06** Special order option
Number of outputs	1	1	1	1	1
GPIB	Yes	Yes	Yes	Yes	Yes
Output ratings					
Output voltage	40 V	56 V	50 V	160 V	135 V
Output current	50 A	38 A	42 A	13 A	16 A
Programming accuracy at 25°C ±5°C					
Voltage 0.04%+	40 mV	60 mV	60 mV	160 mV	125 mV
Current 0.1%+	35 mA	28 mA	30 mA	10 mA	12 mA
Ripple and noise					
from 20 Hz to 20 MHz					
Voltage rms	1 mV	1.25 mV	1.25 mV	2.8 mV	2 mV
Voltge peak to peak	10.5 mV	11 mV	11 mV	20 mV	18 mV
Current rms	40 mA	28 mA	25 mA	18 mA	12 mA
Readback accuracy at 25°C ±5°C (percent of reading plus fixed) System models only					
Voltage 0.05%+	60 mV	90 mV	90 mV	240 mV	185 mV
±Current 0.1%+	60 mA	38 mA	42 mA	14 mA	18 mA
Load and line regulation					
Voltage 0.002%+	1.4 mV	2 mV	2 mV	6 mV	4 mV
Current 0.005%+	4 mA	2 mA	2 mA	1 mA	4 mV
Transient response time	Less than 900 µs for the output voltage to recover 100 mV following a change in load from 100% to 50% or 50% to 100% of the output current rating of the supply				
Supplemental Characteristics	(Non-warranted characteristics determined by design and useful in applying the product)				
Average resolution					
Voltage	10.5 mV	14 mV	12 mV	40 mV	34 mV
Current	12.5 mA	9.5 mA	11 mA	3.25 mA	4 mA
OVP	75 mV	100 mV	85 mV	300 mV	242 mV
Output voltage programming response time*					
(excluding command programming processing time)	130 ms	130 ms	130 ms	280 ms	250 ms

* Full load programming rise/fall time (10% to 90% or 90% to 10%) with full resistive load equal to rated output voltage/rated output current.

More detailed specifications at **www.agilent.com/find/6670**

Single-Output: 2000 W GPIB (Continued)

Ordering information

Opt 200 174 to 220 VAC, 47 to 63 Hz (Japan only)

Opt 230 191 to 250 VAC, 47 to 63 Hz

* **Opt 908** Rack-mount kit (p/n 5062-3977)

* **Opt 909** Rack-mount kit w/handles (p/n 5063-9221)

Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package

Opt 0L2 Extra copy of standard printed documentation package

Opt 0B0 Full documentation on CD-ROM only

Opt 0B3 Service manual

A line cord option must be specified, see the AC line voltage and cord section.

* Support rails required

Accessories

p/n 1494-0059 Accessory slide kit

p/n 1252-3698 7-pin analog plug

p/n 1252-1488 4-pin digital plug

p/n 5080-2148 Serial link cable 2 m (6.6 ft)

E3663AC Support rails for Agilent rack cabinets

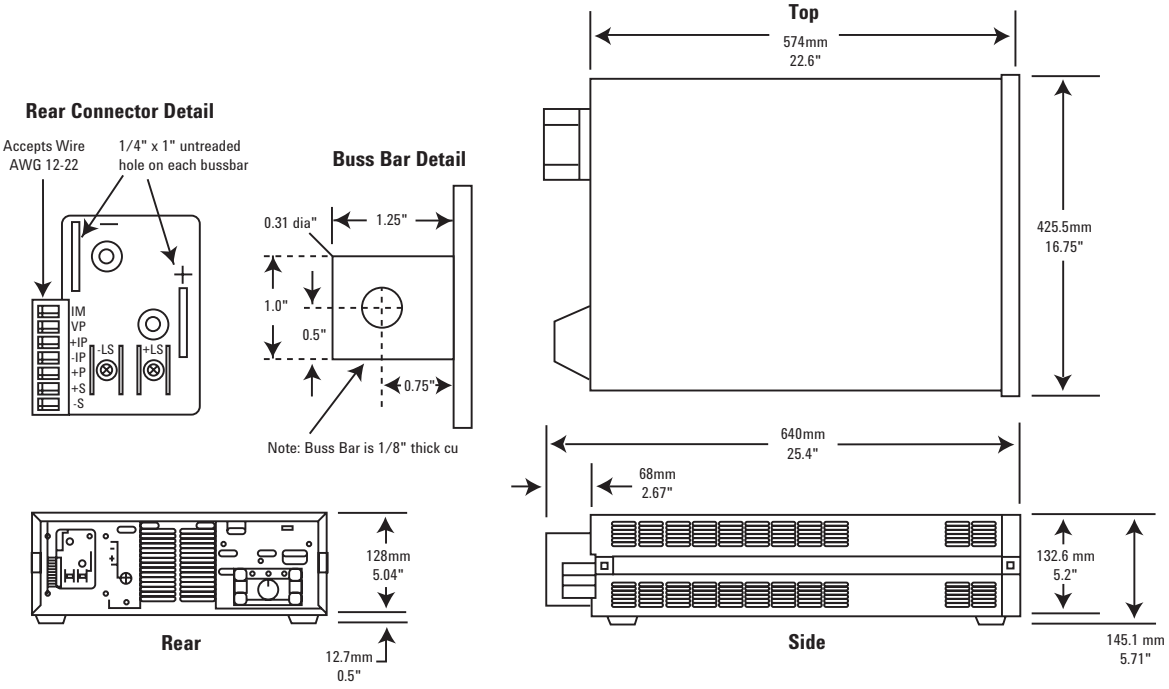
Specifications (at 0° to 55°C unless otherwise specified)	**6675A-J07** Special order option	**6675A-J08** Special order option	**6675A-J09** Special order option	**6675A J11** Special order option
Number of outputs	1	1	1	1
GPIB	Yes	Yes	Yes	Yes
Output ratings				
Output voltage	200 V	100 V	110 V	150 V
Output current	11 A	22 A	20 A	15 A
Programming accuracy at 25°C ±5°C				
Voltage 0.04%+	200 mV	120 mV	120 mV	150 mV
Current 0.1%+	8 mA	15 mA	13.5 mA	11 mA
Ripple and noise				
from 20 Hz to 20 MHz				
Voltage rms	3.5 mV	1.9 mV	1.9 mV	2.5 mV
Voltge peak to peak	25 mV	16 mV	16 mV	18 mV
Current rms	15 mA	15 mA	13.5 mA	12 mA
Readback accuracy at 25°C ±5°C (percent of reading plus fixed) System models only				
Voltage 0.05%+	300 mV	180 mV	180 mV	225 mV
±Current 0.1%+	12 mA	22 mA	20 mA	15 mA
Load and line regulation				
Voltage 0.002% +	7 mV	4 mV	4 mV	6 mV
Current 0.005% +	1 mA	4 mV	4 mV	1 mA
Transient response time	Less than 900 µs for the output voltage to recover 100 mV following a change in load from 100% to 50% or 50% to 100% of the output current rating of the supply			
Supplemental Characteristics	(Non-warranted characteristics determined by design and useful in applying the product)			
Average resolution				
Voltage	50 mV	30 mV	30 mV	37.5 mV
Current	2.75 mA	4.5 mA	4.5 mA	3.75 mA
OVP	360 mV	215 mV	215 mV	270 mV
Output voltage programming response time*				
(excluding command programming processing time)	350 ms	195 ms	195 ms	250 ms

* Full load programming rise/fall time (10% to 90% or 90% to 10%) with full resistive load equal to rated output voltage/rated output current.

More detailed specifications at **www.agilent.com/find/6670**

Single-Output: 2000 W GPIB (Continued)

Agilent Models: 6671A, 6672A, 6673A, 6674A, 6675A



More detailed specifications at **www.agilent.com/find/6670**

E4356A

Single-Output
2000 W GPIB

- Dual range output
- Fast, low-noise outputs
- Analog control of output voltage and current
- Fan-speed control to minimize acoustic noise
- Built-in measurements and advanced programmable features
- Protection features to ensure DUT safety

This 2000 W DC power supply provides over 2000 watts at either 70 or 80 volts. This makes it particularly suitable for a variety of test scenarios for 48 volt systems. Telephone network equipment is one example of such a 48 volt bus application. It also has the unusual combination of high efficiency and low noise operation.

Programming of the DC output and the extensive protection features can be done either from the front panel or using industry standard SCPI commands, via the GPIB. Using the serial link, up to 16 power supplies can be connected through one GPIB address. Test system integration can be further simplified by using the VXI*Plug&Play* drivers. The output voltage and current can also be controlled with analog signals. This is helpful for certain types of noisy environments, and also immediate reactions to process changes.

Lab-bench use is enhanced by the fan-speed control, which minimizes acoustic noise. The extremely low ripple and noise helps the built-in measurement system make extremely accurate current and voltage measurements.

Specifications (at 0° to 55°C unless otherwise specified)	**E4356A**
Number of outputs	1
GPIB	Yes
Output ratings	
Voltage	0 to 70 V/0 to 80 V
Current	0 to 30 A/0 to 26 A
Programming accuracy at 25°C ±5°C (% of setting plus fixed)	
Voltage	0.04% + 80 mV
+Current	0.1% + 25 mA
Ripple and noise	
20 Hz to 20 MHz	
Voltage rms	2 mV
peak-peak	16 mV
Current rms	25 mA
DC measurement accuracy (via GPIB or front panel meters with respect to actual output at 25°C ±5°C	
Voltage	0.05% + 120 mV
Current	0.1% + 35 mA
Transient response time Time for the output voltage to recover to within 20 mV or 0.1% of the voltage rating of the unit following a change in load current of up to 50% of the output current rating.	<900 µs

Application notes

Agilent DC Power Supplies for Base Station Testing
5988-2386EN

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

10 Hints for Using Your Power Supply to Decrease Test Time
5968-6359E

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC maximum from chassis ground.

Remote sensing: Up to half the rated output voltage can be dropped in each load lead. The drop in the load leads subtracts from the voltage available for the load.

More detailed specifications at **www.agilent.com/find/E4356**

Single-Output: 2000 W GPIB
(Continued)

Command processing time: Average time required for the output voltage to begin to change following receipt of digital data is 20 ms for the power supplies connected directly to the GPIB. (Display disabled.)

Output voltage rise time/fall time: 100 ms/200 ms for output to change from 90% to 10% or from 10% to 90% of its total excursion with full resistive load (excludes command processing time).

Modulation: (Analog programming of output voltage and current)
Input signal: 0 to -4 V for voltage and current
Input impedance: 60 kΩ nominal

Input power: 3800 VA, 2600 W at full load; 100 W at no load

GPIB interface capabilities: SH1, AH1, TE6, LE4, SR1, RL1, PP0, DC1, DT1, E1 and C0. IEEE-488.2 and SCPI-compatible command set

Software driver:
- IVI-COM
- VXI*Plug&Play*

Regulatory compliance: Listed to UL1244; certified to CSA556B, conforms to EN61010.

Warranty: One year

Size: 425.5 mm W x 132.6 mm H x 640 mm D

Weight: 27.7 kg (61 lbs) net, 31.4 kg (69 lbs) shipping.

Ordering information

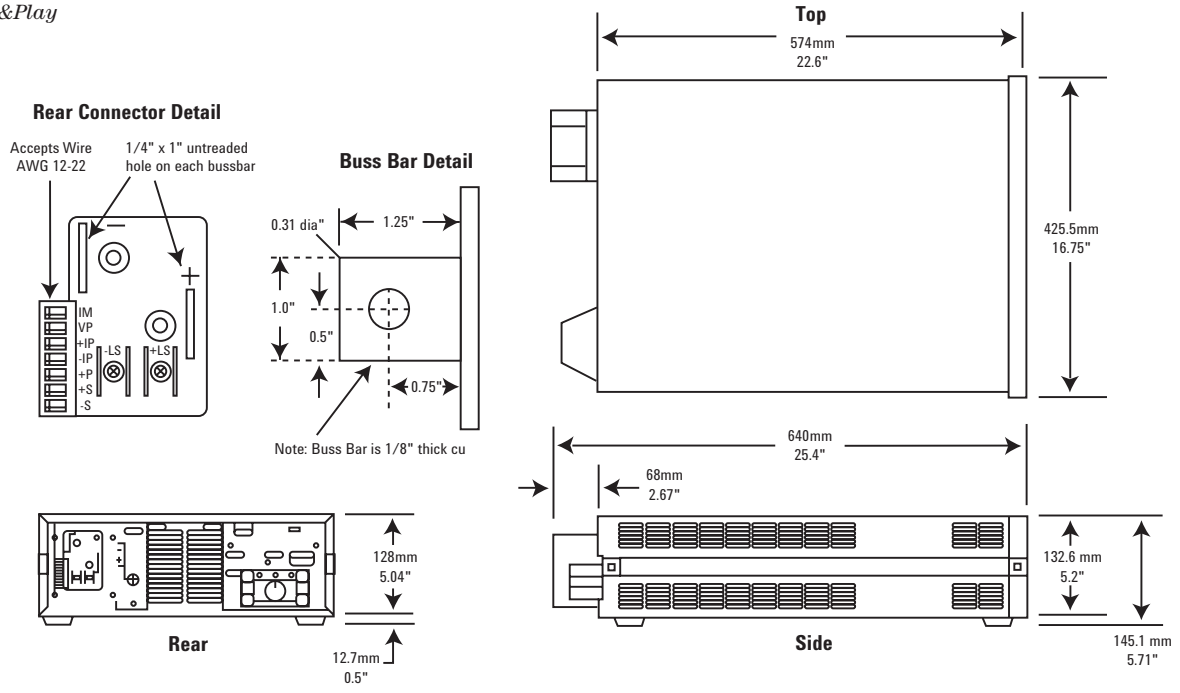
Opt 200 174 to 220 VDC, 47 to 63 Hz (Japan only)
Opt 230 191 to 250 VDC, 47 to 63 Hz
* **Opt 908** Rack-mount kit (p/n 5062-3977)
* **Opt 909** Rack-mount kit w/handles (p/n 5063-9221)

Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual
A line cord option must be specified, see the AC line voltage and cord section.

* Support rails required

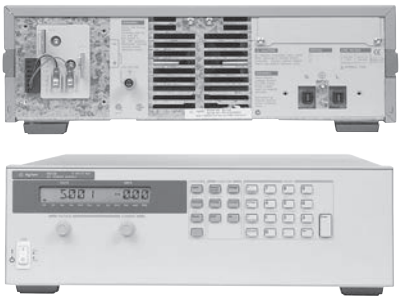
Accessories
p/n 1494-0059 Accessory slide kit
p/n 1252-3698 7-pin analog plug
p/n 1252-1488 4-pin digitial plug
p/n 5080-2148 Serial link cable 2 m (6.6 ft)
E3663AC Support rails for Agilent rack cabinets

Agilent Models: E4356A



More detailed specifications at **www.agilent.com/find/E4356**

Single-Output
2000 W



6571A-6575A

Front panel and analog control of output voltage and current
Fast, low-noise outputs
Fan-speed control to minimize acoustic noise
Protection features to ensure DUT safety

This series of 2000 watt DC power supplies has the exceptional, proven reliability that test system engineers look for. It also has the unusual combination of high efficiency and low noise operation.

These DC power supplies can be controlled either from the front panel or via an analog programming voltage. When used in a test system, the fast up and down programming helps decrease test time. Quickly reacting protection features, including CV/CC mode crossover and over-voltage protection help protect your valuable assemblies from damage.

Lab-bench use is enhanced by the fan-speed control, which minimizes acoustic noise. The extremely low ripple and noise helps the test engineer make extremely accurate current and voltage measurements.

Specifications (at 0° to 55°C unless otherwise specified)		**6571A**	**6572A**	**6573A**	**6574A**	**6575A**	**6571A-J03** Special order option
Number of outputs		1	1	1	1	1	1
GPIB		No	No	No	No	No	No
Output ratings							
Output voltage		0 to 8 V	0 to 20 V	0 to 35 V	0 to 60 V	0 to 120 V	14 V
Output current		0 to 220 A	0 to 100 A	0 to 60 A	0 to 35 A	0 to 18 A	150 A
Programming accuracy at 25°C ±5°C							
Voltage	0.04% +	8 mV	20 mV	35 mV	60 mV	120 mV	14 mV
Current	0.1% +	125 mA	60 mA	40 mA	25 mA	12 mA	90 mA
Ripple and noise from 20 Hz to 20 MHz							
Voltage rms		650 µV	750 µV	800 µV	1.25 mV	1.9 mV	1.5 mV
peak-peak		7 mV	9 mV	9 mV	11 mV	16 mV	15 mV
Current rms		200 mA	100 mA	40 mA	25 mA	12 mA	150 mA
Load regulation and line regulation							
Voltage	0.002%+	300 µV	650 µV	1.2 mV	2 mV	4 mV	600 µV
Current	0.005%+	10 mA	7 mA	4 mA	2 mA	1 mA	7 mA
Transient response time		Less than 900 µs for the output voltage to recover 100 mV following a change in load from 100% to 50% or 50% to 100% of the output current rating of the supply					
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)					
Average resolution							
Voltage		2 mV	5 mV	9 mV	15 mV	30 mV	4 mV
Current		55 mA	25 mA	15 mA	8.75 mA	4.5 mA	40 mA
OVP		15 mV	35 mV	65 mV	100 mV	215 mV	28 mV
Output voltage programming response time*							
*Full load programming rise/fall time (10% to 90% or 90% to 10%) with full resistive load equal to rated output voltage/rated output current.		30 ms	60 ms	130 ms	130 ms	195 ms	30 ms

More detailed specifications at **www.agilent.com/find/6570**

Single-Output: 2000 W (Continued)

Application notes

Agilent DC Power Supplies for Base Station Testing
5988-2386EN

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC from chassis ground

Output common-mode noise current: (to signal ground binding post) 500 µArms, 4 mA peak-to-peak

Remote sensing: Up to half the rated output voltage can be dropped in each load lead. The drop in the load leads subtracts from the voltage available for the load.

Modulation: (Analog programming of output voltage and current)
Input signal: 0 to -4 V for voltage, 0 to 7 V for current
Input impedance: 30 kΩ or greater

Input power: 3,800 VA, 2,600 W at full load; 170 W at no load

Regulatory compliance: Listed to UL1244; certified to CSA556B; conforms to IEC 61010-1.

Size: 425.5 mm W x 132.6 mm H x 640 mm D (16.75 in x 5.22 in x 25.2 in)

Weight: Net, 28.2 kg (62 lb); shipping, 31.8 kg (70 lb)

Warranty: One year

Specifications (at 0° to 55°C unless otherwise specified)		**6571A-J04** Special order option	**6571A-J17** Special order option	**6573A-J03** Special order option	**6573A-J08** Special order option	**6574A-J03** Special order option	**6574A-J07** Special order option
Number of outputs		1	1	1	1	1	1
GPIB		No	No	No	No	No	No
Output ratings							
Output voltage		10 V	15 V	37.5 V	40 V	56 V	50 V
Output current		200 A	120 A	45 A	50 A	38 A	42 A
Programming accuracy at 25°C ±5°C							
Voltage	0.04% +	10 mV	15 mV	37.5 mV	40 mV	60 mV	60 mV
Current	0.1% +	125 mA	90 mA	40 mA	35 mA	28 mA	30 mA
Ripple and noise from 20 Hz to 20 MHz							
Voltage rms		750 µV	1.5 mV	800 µV	1 mV	1.25 mV	1.25 mV
peak-peak		9 mV	15 mV	9 mV	10.5 mV	11 mV	11 mV
Current rms		200 mA	150 mA	40 mA	40 mA	28 mA	25 mA
Load regulation and line regulation							
Voltage	0.002%+	300 uV	650 uV	1.2 mV	1.4 mV	2 mV	2 mV
Current	0.005%+	10 mA	7 mA	4 mA	4 mA	2 mA	2 mA
Transient response time		Less than 900 µs for the output voltage to recover 100 mV following a change in load from response time 100% to 50% or 50% to 100% of the output current rating of the supply					
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)					
Average resolution							
Voltage		2.5 mV	4 mV	10 mV	10.5 mV	14 mV	12 mV
Current		55 mA	35 mA	15 mA	12.5 mA	9.5 mA	11 mA
OVP		20 mV	30 mV	65 mV	75 mV	100 mV	85 mV
Output voltage programming response time*							
*Full load programming rise/fall time (10% to 90% or 90% to 10%) with full resistive load equal to rated output voltage/rated output current.		35 ms	35 ms	130 ms	130 ms	130 ms	130 ms

More detailed specifications at **www.agilent.com/find/6570**

Single-Output: 2000 W (Continued)

Ordering information

Opt 200 174 to 220 VAC, 47 to 63 Hz (Japan only)
Opt 230 191 to 250 VAC, 47 to 63 Hz
* **Opt 908** Rack-mount kit (p/n 5062-3977)
* **Opt 909** Rack-mount kit w/handles (p/n 5063-9221)
Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual
A line cord option must be specified, see the AC line voltage and cord section.

* Support rails required

Accessories

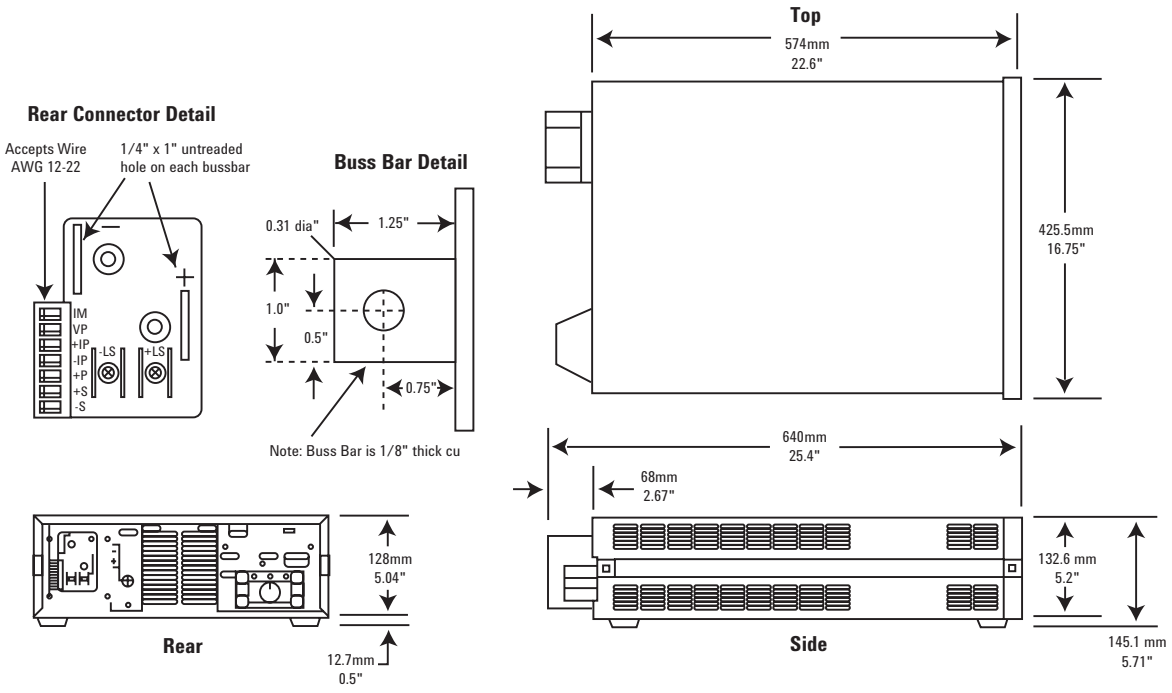
p/n 1494-0059 Accessory slide kit
E3663AC Support rails for Agilent rack cabinets

Specifications (at 0° to 55°C unless otherwise specified)		**6575A-J04** Special order option	**6575A-J06** Special order option	**6575A-J07** Special order option	**6575A-J08** Special order option	**6575A-J09** Special order option	**6575A-J11** Special order option
Number of outputs		1	1	1	1	1	1
GPIB		No	No	No	No	No	No
Output ratings							
Output voltage		160 V	135 V	200 V	100 V	110 V	150 V
Output current		13 A	16 A	11 A	22 A	20 A	15 A
Programming accuracy at 25°C ±5°C							
Voltage	0.04% +	160 mV	125 mV	200 mV	120 mV	120 mV	150 mV
Current	0.1% +	10 mA	12 mA	8 mA	15 mA	13.5 mA	11 mA
Ripple and noise from 20 Hz to 20 MHz							
Voltage rms		2.8 mV	2 mV	3.5 mV	1.9 mV	1.9 mV	2.5 mV
peak-peak		20 mV	18 mV	25 mV	16 mV	16 mV	18 mV
Current rms		18 mA	12 mA	15 mA	15 mA	13.5 mA	12 mA
Load regulation and line regulation							
Voltage	0.002%+	6 mV	4 mV	7 mV	4 mV	4 mV	6 mV
Current	0.005%+	1 mA	4 mV	1 mA	4 mV	4 mV	1 mA
Transient response time		Less than 900 µs for the output voltage to recover 100 mV following a change in load from response time 100% to 50% or 50% to 100% of the output current rating of the supply					
Supplemental Characteristics		(Non-warranted characteristics determined by design and useful in applying the product)					
Average resolution							
Voltage		40 mV	34 mV	50 mV	30 mV	30 mV	37.5 mV
Current		3.25 mA	4 mA	2.75 mA	4.5 mA	4.5 mA	3.75 mA
OVP		300 mV	242 mV	360 mV	215 mV	215 mV	270 mV
Output voltage programming response time*							
*Full load programming rise/fall time (10% to 90% or 90%to 10%) with full resistive load equal to rated output voltage/rated output current.		280 ms	250 ms	350 ms	195 ms	195 ms	250 ms

More detailed specifications at **www.agilent.com/find/6570**

Single-Output: 2000 W (Continued)

Agilent Models: 6571A, 6572A, 6573A, 6574A, 6575A



More detailed specifications at **www.agilent.com/find/6570**

6680A-6684A

Single-Output
5000 W GPIB

- Low output ripple and noise
- Selectable compensation for inductive loads
- Analog control of output voltage and current
- Fan-speed control to minimize acoustic noise
- Built-in measurements and advanced programmable features
- Protection features to ensure DUT safety

Reliable DC power for manufacturing test and long-term burn-In

This series of 5000 watt DC power supplies has the exceptional, proven reliability that test system engineers look for. It also has the features needed for easy test system integration.

Programming of the DC output and the extensive protection features can be done either from the front panel or using industry standard SCPI commands, via the GPIB. Using the serial link, up to 16 power supplies can be connected through one GPIB address. Test system integration can be further simplified by using the VXI*Plug&Play* drivers. The output voltage and current can also be controlled with analog signals. This is helpful for certain types of noisy environments, and also immediate reactions to process changes.

The 6680A series has extremely low ripple and noise for a 5000 watt DC power supply. This helps the built-in measurement system make extremely accurate current and voltage measurements.

Selectable compensation is provided for problem-free powering of inductive loads.

Specifications (at 0° to 55°C unless otherwise specified)	**6680A**	**6681A**	**6682A**	**6683A**	**6684A**	**6680A-J04** Special order option
Number of outputs	1	1	1	1	1	1
GPIB	Yes	Yes	Yes	Yes	Yes	Yes
Output ratings						
Voltage	0 to 5 V	0 to 8 V	0 to 21 V	0 to 32 V	0 to 40 V	0 to 3.3 V
Current (40°C then derate linearly 1%/°C from 40°C to 55°C)	0 to 875 A	0 to 580 A	0 to 240 A	0 to 160 A	0 to 128 A	0 to 1000 A
Programming accuracy at 25°C ±5°C						
Voltage 0.04% +	5 mV	8 mV	21 mV	32 mV	40 mV	5 mV
Current 0.1% +	450 mA	300 mA	125 mA	85 mA	65 mA	450 mV
Ripple and noise constant voltage mode from 20 Hz to 20 MHz						
rms	1.5 mV	1.5 mV	1.5 mV	1.0 mV	1.0 mV	3.4 mV
peak to peak	10 mV	10 mV	10 mV	10 mV	10 mV	15 mV
Readback accuracy at 25°C ±5°C	(percent of reading plus fixed)					
Voltage 0.05% +	7.5 mV	12 mV	32 mV	48 mV	60 mV	7.5 mV
Current 0.1% +	600 mA	400 mA	165 mA	110 mA	90 mA	600 mA
Load and line regulation						
Voltage 0.002% +	0.19 mV	0.3 mV	0.65 mV	1.1 mV	1.5 mV	0.19 mV
Current 0.005% +	65 mA	40 mA	17 mA	12 mA	9 mA	77 mA
Transient response time	Less than 900 µs for the output voltage to recover within 150 mV following a change in load from 100% to 50%, or 50% to 100% of the output current rating of the supply					
Supplemental Characteristics	(Non-warranted characteristics determined by design that are useful in applying this product)					
Ripple and noise constant current mode from 20 Hz to 20 MHz						
rms	290 mA	190 mA	40 mA	28 mA	23 mA	500 mA
Average programming resolution						
Voltage	1.35 mV	2.15 mV	5.7 mV	8.6 mV	10.8 mV	12 mV
Current	235 mA	155 mA	64 mA	43 mA	34 mA	260 mA
OVP	30 mV	45 mV	120 mV	180 mV	225 mV	25 mV
Output voltage programming response time	9 ms	12 ms	45 ms	60 ms	60 ms	9 ms
(excludes command-processing time)	Full-load progrmming rise or fall time (10 to 90% or 90 to 10%, resistive load)					
Output common-mode noise current rms	1.5 mA	1.5 mA	3 mA	3 mA	3 mA	2.0 mA
(to signal-ground binding post) peak-to-peak	10 mA	10 mA	20 mA	20 mA	20 mA	12.5 mA

More detailed specifications at **www.agilent.com/find/6680**

Single-Output: 5000 W GPIB (Continued)

Application notes

6671A/72A/81A/82A/90A System DC Power Supplies Product Overview
5988-3050EN

Agilent DC Power Supplies for Base Station Testing
5988-2386EN

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±60 VDC maximum from chassis ground

Remote sensing: Up to half the rated output voltage can be dropped in each load lead. The drop in the load leads subtracts from the voltage available for the load.

Command processing time: Average time required for the output voltage to begin to change following receipt of digital data is 20 ms for power supplies connected directly to the GPIB

Modulation: (analog programming of output voltage and current):
Input signal: 0 to -5 V for voltage, 0 to +5 V for current
Input impedance: 30 kΩ/or greater

AC Input (47 to 63 Hz): 180 to 235 VAC (line-to-line, 3 phase), 27.7 Arms maximum worst case, 21.4 Arms nominal; 360 to 440 Vac, 14.3 Arms maximum worst case, 10.7 Arms nominal (maximum line current includes 5% unbalanced phase voltage condition.) Output voltage derated 5% at 50 Hz and below 200 Vac.

Input power: 7350 VA and 6000 W maximum; 160 W at no load

GPIB interface capabilities: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, E1, and C0. IEEE-488.2 and SCPI command set.

Software driver:
- IVI-COM
- VXI*Plug&Play*

Size: 425.5 mm W x 221.5 mm H x 674.7 mm D (16.75 in x 8.75 in x 25.56 in)

Weight: Net, 51.3 kg (113 lbs); shipping, 63.6 kg (140 lbs)

Warranty: One year

Ordering information

Opt 208 180 to 235 VAC, 3 phase, 47 to 63 Hz

Opt 400 360 to 440 VAC, 3 phase, 47 to 63 Hz

Opt 602 Two bus bar spacers for paralleling power supplies (p/n 5060-3514)

* **Opt 908** Rack-mount kit (p/n 5062-3977 and p/n 5062-3974)

* **Opt 909** Rack-mount kit with handles (p/n 5063-9221 and p/n 5063-9219).

Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package

Opt 0L2 Extra copy of standard printed documentation package

Opt 0B0 Full documentation on CD-ROM only

Opt 0B3 Service manual

* Support rails required

Accessories

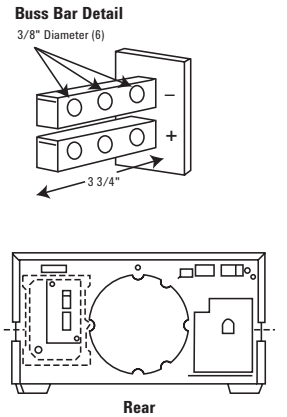
p/n 5060-3513 Three 30-A replacement fuses for 180 to 235 VAC line

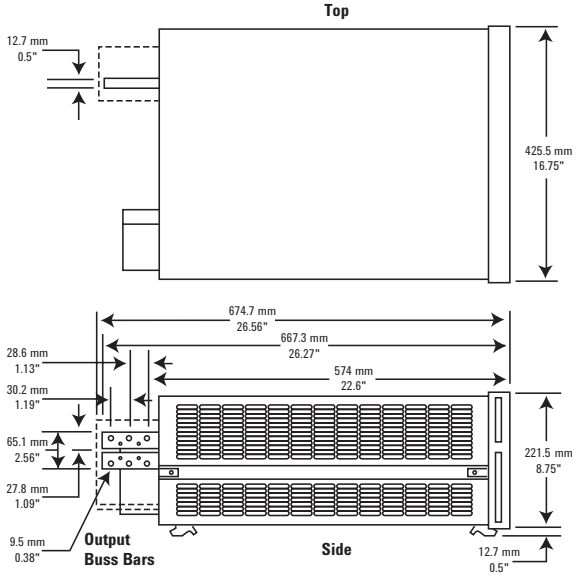
p/n 5060-3512 Three 16-A replacement fuses for 360 to 440 VAC line

E3663AC Support rails for Agilent rack cabinets

p/n 5080-2148 Serial link cable 2 m (6.6 ft.)

Agilent Models: 6680A, 6681A, 6682A, 6683A, 6684A





More detailed specifications at **www.agilent.com/find/6680**

6690A-6692A

Single-Output
6600 W GPIB

- Low output ripple and noise
- Analog control of output voltage and current
- Fan-speed control to minimize acoustic noise
- Built-in measurements and advanced programmable features
- Protection features to ensure DUT safety

Reliable DC power for manufacturing test and long-term burn-in

This series of 6600 watt DC power supplies has the exceptional, proven reliability that test system engineers look for. It also has the features needed for easy test system integration.

Programming of the DC output and the extensive protection features can be done either from the front panel or using industry standard SCPI commands, via the GPIB. Using the serial link, up to 16 power supplies can be connected through one GPIB address. Test system integration can be further simplified by using the VXI*plug&play* drivers. The output voltage and current can also be controlled with analog signals. This is helpful for certain types of noisy environments, and also immediate reactions to process changes.

The 6690A series has extremely low ripple and noise for a 6600 watt DC power supply. This helps the built-in measurement system make extremely accurate current and voltage measurements.

Specifications (at 0° to 55°C unless otherwise specified)		**6690A**	**6691A**	**6692A**
Number of outputs		1	1	1
GPIB		Yes	Yes	Yes
Output ratings				
Voltage		0 to 15 V	0 to 30 V	0 to 60 V
Current (derated linearly 1%/°C from 40°C to 55°C)		0 to 440 A	0 to 220 A	0 to 110 A
Programming accuracy at 25°C ±5°C				
Voltage	0.04% +	15 mV	30 mV	60 mV
Current	0.1% +	230 mA	125 mA	65 mA
Ripple and noise constant voltge mode from 20 Hz to 20 MHz				
	rms	2.5 mV	2.5 mV	2.5 mV
	peak to peak	15 mV	25 mV	25 mV
Readback accuracy at 25°C ±5°C (percent of reading plus fixed offset) System models only				
Voltage	0.05% +	22.5 mV	45 mV	90 mV
Current	0.1% +	300 mA	165 mA	80 mA
Load regulation				
Voltage	0.002% +	0.65 mV	1.1 mV	2.2 mV
Current	0.005% +	40 mA	17 mA	9 mA
Line regulation				
Voltage	0.002% +	0.65 mV	0.65 mV	0.65 mV
Current	0.005% +	40.5 mA	17 mA	9 mA
Transient response time		Less than 900 µs for the output voltage to recover within 150 mV following a change in load from 100% to 50%, or 50% to 100% of the output current rating of the supply		

Application notes

6671A/72A/81A/82A/90A System DC Power Supplies Product Overview
5988-3050EN

Using Agilent 6690A Series System DC Power Supplies for Testing Data Storage Control Boards
(PN 6690A-1)
5988-3062EN

Using Agilent 6690A Series System DC Power Supplies for Automobile Battery Simulation
(PN 6690A-2)
5988-3061EN

More detailed specifications at **www.agilent.com/find/6690**

Single-Output: 6600 W GPIB (Continued)

Specifications (at 0° to 55°C unless otherwise specified)	**6690A**	**6691A**	**6692A**

Supplemental characteristics for all model numbers

DC floating voltage: Output terminal can be floated up to ±60 VDC from chassis ground

Remote sensing: Up to half the rated output voltage can be dropped in each load lead. The drop in the load leads subtracts from the voltage available at the load.

Command processing time: Average time required for the output voltage to begin to change following receipt of digital data is 20 ms for power supplies connected directly to the GPIB.

Modulation: (analog programming of output voltage and current):
Input signal: 0 to -5 V for voltage, and 0 to +5 V for current.
Input impedance: 30 kΩ or greater.

AC input (47 to 63 Hz): 180 to 235 VAC (line-to-line 3 phase) 36 Arms maximum worst case, 28 Arms nominal; 360 to 440 VACX, 18 Arms maximum worst case, 14 Arms nominal. (Maximum line current includes 5% unbalanced phase voltage condition).

Software driver:
- IVI-COM
- VXI*Plug&Play*

Input power: 9000 VA and 7950 W maximum; 175 W at no load.

Size: 425.5 mm W x 221.5 mm H x 674.7 mm D (16.75 in x 8.75 in x 25.56 in).

Warranty: One year

Ordering information

Opt 208 180 to 235 VAC, 3 phase, 47 to 63 Hz

Opt 400 360 to 440 VAC, 3 phase, 47 to 63 Hz

Opt 602 Two bus bar spacers for paralleling power supplies (p/n 5060-3514)

* **Opt 908** Rack-mount kit (p/n 5062-3977 and p/n 5063-9212)

* **Opt 909** Rack-mount kit with handles (p/n 5063-9221 and p/n 5063-9219).

Supplemental Characteristics	(Non-warranted characteristics determined by design that are useful in applying this product)		
Ripple and noise constant current mode from 20 Hz to 20 MHz			
rms	200 mA	50 mA	30 mA
Average programming resolution			
Voltage	4.1 mV	8.1 mV	16 mV
Current	118.5 mA	59 mA	30 mA
OVP	90 mV	170 mV	330 mV
Output voltage programming response time (excludes command-processing time) Full-load progrmming rise or fall time (10 to 90% or 90 to 10%, resistive load)	45 ms	60 ms	100 ms
Output common-mode noise current rms	3 mA	3.5 mA	4 mA
(to signal-ground binding post) peak-to-peak	20 mA	20 mA	25 mA

Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package

Opt 0L2 Extra copy of standard printed documentation package

Opt 0B0 Full documentation on CD-ROM only

Opt 0B3 Service manual

* Support rails required

Accessories

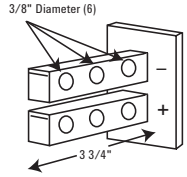
p/n 5065-6935 Replacement fuse kit for 360-440 VAC line.

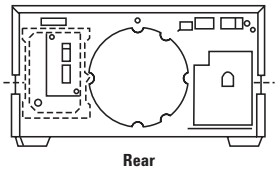
p/n 5065-6934 Replacement fuse kit for 180-235 VAC line.

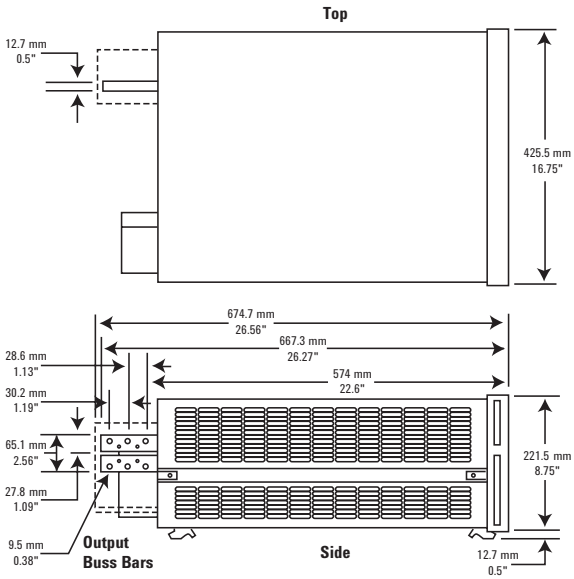
E3663AC Support rails for Agilent rack cabinets.

p/n 5080-2148 Serial link cable 2 m (6.6 ft.)

Agilent Models: 6690A, 6691A, 6692A







More detailed specifications at **www.agilent.com/find/6690**

6621A-6624A, 6627A

Multiple-Output
40 W-105 W GPIB

Up to four fully isolated power supplies in a 3U package
Dual-range outputs
Fast, low-noise outputs
Built-in measurements and advanced programmable features
Protection features to ensure DUT safety

Two, three, or four isolated outputs are integrated into one package, conserving rack space and GPIB addresses. Most of the outputs also provide dual ranges, for more current at lower voltage levels. The outputs can be connected in parallel or series to further increase the flexibility that these products offer the system designer.

Programming is done using industry standard SCPI commands. Test system integration can be further simplified by using the VXI*Plug&Play* drivers. These power supplies help reduce test time with fast up and down programming, which is enhanced by an active downprogrammer which can sink the full rated current.

Application notes

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

10 Hints for Using Your Power Supply to Decrease Test Time
5968-6359E

Understanding Linear Power Supply Operation
(AN1554)
5989-2291EN

Modern Connectivity - Using USB and LAN I/O Converters
(AN 1475-1)
5989-0123EN

Specifications (at 0° to 55°C unless otherwise specified)		40 W output	40 W output	80 W output	80 W output	105 W output
Output power	Low-range volts, amps	0 to 7 V, 0 to 5 A	0 to 20 V, 0 to 2 A	0 to 7 V, 0 to 10 A	0 to 20 V, 0 to 4 A	0-35 V, 0-3 A
	High range volts, amps	0 to 20 V, 0 to 2 A	0 to 50 V, 0 to 0.8 A	0 to 20 V, 0 to 4 A	0 to 50 V, 0 to 2 A	— —
Output combinations for each model (total number of outputs)	**6621A (2)**	—	—	2	—	—
	6622A (2)	—	—	—	2	—
	6623A (3)	1	1	1	—	—
	6624A (4)	2	2	—	—	—
	6627A (4)	—	4	—	—	—
	6623A-J03 (3) Special order option	—	2	—	—	1
Programming accuracy	Voltage	19 mV + 0.06%	50 mV + 0.06%	19 mV + 0.06%	50 mV + 0.06%	35 mV + 0.06%
	Current	50 mA + 0.16%	20 mA + 0.16%	100 mA + 0.16%	40 mA + 0.16%	30 mA + 0.16%
Readback accuracy (at 25°C ±5°C)	Voltage	20 mV + 0.05%	50 mV + 0.05%	20 mV + 0.05%	50 mV + 0.05%	35 mV + 0.05%
	+Current	10 mA + 0.1%	4 mA + 0.1%	20 mA + 0.1%	8 mA + 0.1%	6 mA + 0.1%
	-Current	25 mA + 0.2%	8 mA + 0.2%	50 mA + 0.2%	20 mA + 0.2%	15 mA + 0.2%
Ripple and noise (peak-to-peak, 20 Hz to 20 MHz; rms, 20 Hz to 10 MHz)						
	Constant voltage rms	500 µV	500 µV	500 µV	500 µV	500 µV
	peak-to-peak	3 mV	3 mV	3 mV	3 mV	3 mV
	Constant current rms	1 mA	1 mA	1 mA	1 mA	1 mA
Load regulation	Voltage	2 mV	2 mV	2 mV	2 mV	2 mV
	Current	1 mA	0.5 mA	2 mA	1 mA	2 mA
Load cross regulation	Voltage	1 mV	2.5 mV	1 mV	2.5 mV	N/A
	Current	1 mA	0.5 mA	2 mA	1 mA	N/A
Line regulation	Voltage	0.01% + 1 mV	0.01% + 1 mV	0.01% + 1 mV	0.01% + 1 mV	0.01% + 1 mV
	Current	0.06% + 1 mA	0.06% + 1 mA	0.06% + 1 mA	0.06% + 1 mA	0.06% + 1 mA

Transient response time Less than 75 µs for the output to recover to within 75 mV of nominal value following a load change within specfications

More detailed specifications at **www.agilent.com/find/6620**

Multiple-Output: 40 W-105 W GPIB (Continued)

Specifications

(at 0° to 55°C unless otherwise specified)

40 W output	40 W output	80 W output	80 W output	105 W output

Supplemental characteristics for all model numbers

DC floating voltage: All outputs can be floated up to ±240 VDC from chassis ground

Remote sensing: Up to 1 V drop per load lead. The drop in the load leads is subtracted from the voltage available for the load.

Command processing time: 7 ms typical with front-panel display disabled

Down programming: Current sink limits are fixed approximately 10% higher than source limits for a given operating voltage above 2.5 V

Input power: 550 W max., 720 VA max.

GPIB interface capabilities: SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT0.

Software driver: VXI*Plug&Play*

Regulatory compliance: Listed to UL1244; conforms to IEC 61010-1; carries the CE mark.

Size: 425.5 mm W x 132.6 mm H x 497.8 mm D (16.75 in x 5.22 in x 19.6 in)

Weight: Net, 17.4 kg (38 lb); shipping, 22.7 kg (50 lb)

Warranty: One year

Ordering information

Opt 100 87 to 106 VAC, 47 to 66 Hz input, 6.3 A (Japan only)
Opt 120 104 to 127 VAC, 47 to 63 Hz
Opt 220 191 to 233 VAC, 47 to 66 Hz, 3.0 A
Opt 240 209 to 250 VAC, 47 to 66 Hz, 3.0 A
Opt 750 Relay Control and DFI/RI
Opt S50 similar to option 750, however the remote inhibit does not latch
* **Opt 908** Rack-mount kit (p/n 5062-3977)
* **Opt 909** Rack-mount kit with handles (p/n 5063-9221)
Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package

Supplemental Characteristics

(Non-warranted characteristics determined by design and useful in applying the product)

		40 W output	40 W output	80 W output	80 W output	105 W output
Average programming resolution	Voltage	6 mV	15 mV	6 mV 20 mV (high)	6 mV 20 mV (high)	10.5 mV
	Current	25 mA	10 mA	50 mA 20 mA (high)	50 mA 20 mA (high)	15 mA
OVP		100 mV	250 mV	100 mV 2	50 mV	175 mV
Output programming response time (time to settle within 0.1% of full scale output, after Vset command has been processed)		2 ms	6 ms	2 ms	6 ms	6 ms

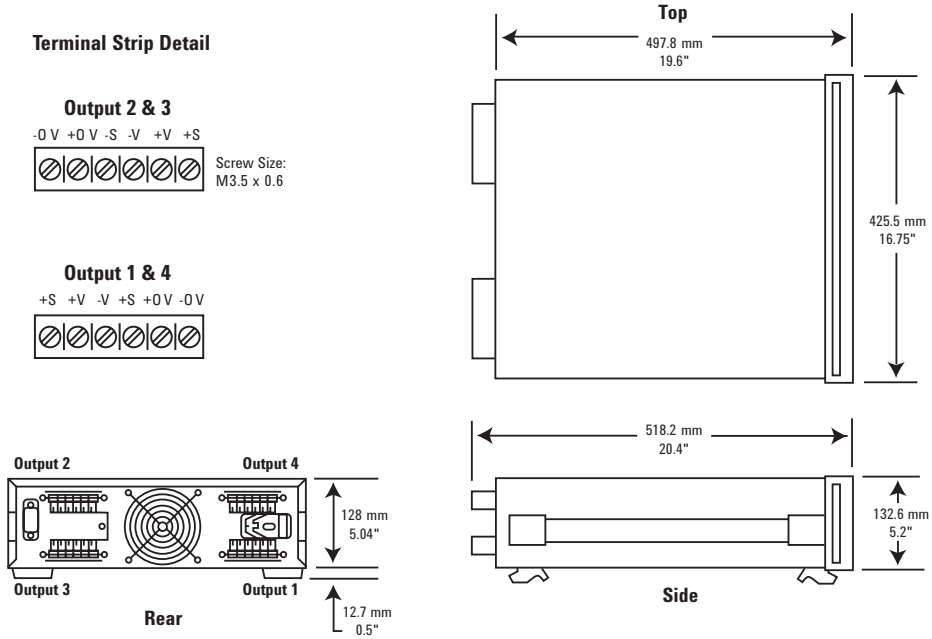
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual

* Support rails required

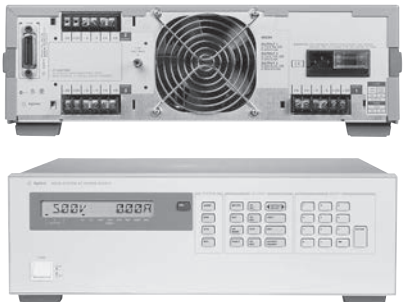
Accessories

p/n 1494-0059 Rack slide kit
E3663A Support rails for Agilent rack cabinets

Agilent Models: 6621A, 6622A, 6623A, 6624A, 6627A



More detailed specifications at **www.agilent.com/find/6620**



6625A, 6626A, 6628A, 6629A

Precision Multiple-Output
25 W-50 W GPIB

Up to four fully isolated power supplies in a 3U package
Fast, low-noise outputs
Dual-range, precision low current measurement
Built-in measurements and advanced programmable features
Protection features to ensure DUT safety

Two or four isolated outputs are integrated into one package, conserving rack space and GPIB addresses. Dual ranges allow for more current at lower voltage levels. The outputs can be connected in parallel or series to further increase the flexibility that these products offer the system designer. Programming is done using industry standard SCPI commands and test system integration can be further simplified be using the VXI*plug&play* drivers. These power supplies help reduce test time with fast up and down programming, which is enhanced by the active down-programmer which can sink the full rated current.

These power supplies are very useful on the R&D bench. The accuracy of both the programming and the measurement systems allow precise control and monitoring of prototype bias power. The extensive protection features protect valuable prototypes, including very fast CV/CC crossover. The power supply can be controlled from either the front panel keypad or, for automated testing, from the GPIB.

Specifications (at 0° to 55°C unless otherwise specified)		**25 W output**	**50 W output**
Output power	Low-range volts, amps	0 to 7 V, 0 to 15 mA	0 to 16 V, 0 to 200 mA
	High range volts, amps	0 to 50 V, 0 to 500 mA	0 to 50 V, 0 to 1 A or 0 to 16 V, 0 to 2 A
Output combinations for each model (total number of outputs)	**6625A (2) precision**	1	1
	6626A (4) precision	2	2
	6628A (2) precision	—	2
	6629A (4) precision	—	4
Programming accuracy (at 25°C ±5°C)	Voltage	1.5 mV + 0.016% (low) 10 mV + 0.016% (high)	3 mV + 0.016% (low) 10 mV + 0.016% (high)
	Current	15 µA + 0.04% (low) 100 µA + 0.04% (high)	185 µA + 0.04% (low) 500 µA + 0.04% (high)
Readback accuracy (at 25°C ±5°C)	Voltage	0.016% + 2 mV (low) 0.016% + 10 mV (high)	0.016% + 3.5 mV (low) 0.016% + 10 mV (high)
	±Current	0.03% + 15 µA (low) 0.03% + 130 µA (high)	0.04% + 250 µA (low) 0.04% + 550 µA (high)
Ripple and noise	Constant voltage rms	500 µV	500 µV
(peak-to-peak, 20 Hz to 20 MHz; rms, 20 Hz to 10 MHz)	peak-to-peak	3 mV	3 mV
	Constant current rms	0.1 mA	0.1 mA
Load regulation	Voltage	0.5 mV	0.5 mV
	Current	0.005 mA	0.01 mA
Load cross regulation	Voltage	0.25 mV	0.25 mV
	Current	0.005 mA	0.01 mA
Line regulation	Voltage	0.5 mV	0.5 mV
	Current	0.005 mA	0.01 mA
Transient response time change within specfications	Less than 75 µs for the output to recover to within 75 mV of nominal value following a load		
Supplemental Characteristics	(Non-warranted characteristics determined by design and useful in applying the product)		
Average programming resolution	Voltage	460 µV (low)	1 mV (low)
		3.2 mV (high)	3.2 mV (high)
	Current	1 µA (low)	13 µA (low)
		33 µA (high)	131 µA (high)
	OVP	230 mV	230 mV
Output programming response time		6 ms	6 ms
(time to settle within 0.1% of full scale output, after Vset command has been processed)			

More detailed specifications at **www.agilent.com/find/6620**

Precision Multiple-Output: 25 W-50 W GPIB (Continued)

Application notes

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

10 Hints for Using Your Power Supply to Decrease Test Time
5968-6359E

Understanding Linear Power Supply Operation
(AN1554)
5989-2291EN

Modern Connectivity - Using USB and LAN I/O Converters
(AN 1475-1)
5989-0123EN

Supplemental characteristics for all model numbers

DC floating voltage: All outputs can be floated up to ±240 VDC from chassis ground

Remote sensing: Up to 10 V drop per load lead. The drop in the load leads is subtracted from the voltage available for the load.

Command processing time: 7 ms typical with front-panel display disabled

Input power: 550 W max., 720 VA max.

GPIB interface capabilities: SH1, AH1, T6, L4, SR1, RL1, PP1, DC1, DT0, C0, E1.

Software driver:
VXI*Plug&Play*

Regulatory compliance: Listed to UL 1244; conforms to IEC 61010-1.

Size: 425.5 mm W x 132.6 mm H x 497.8 mm D (16.75 in x 5.22 in x 19.6 in)

Weight: 6626A, 6629A: Net, 17.4 kg (38 lb); shipping, 22.7 kg (50 lb) 6625A, 6628A: Net, 15.5 kg (34 lb); shipping, 20.8 kg (46 lb)

Warranty: One year

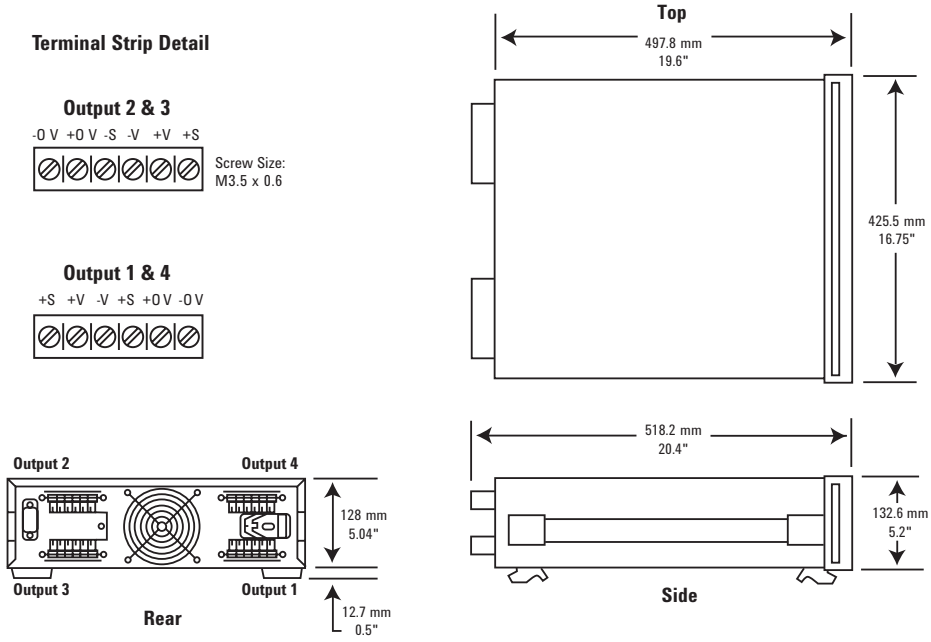
Ordering information

Opt 100 87 to 106 VAC, 47 to 66 Hz input, 6.3 A (Japan only)
Opt 120 104 to 127 VAC, 47 to 63 Hz
Opt 220 191 to 233 VAC, 47 to 66 Hz, 3.0 A
Opt 240 209 to 250 VAC, 47 to 66 Hz, 3.0 A
Opt 750 Relay control and DFI/RI
Opt S50 Similar to option 750, however the remote inhibit does not latch
* **Opt 908** Rack-mount kit (p/n 5062-3977)
* **Opt 909** Rack-mount kit with handles (p/n 5063-9221)
Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual

* Support rails required

Accessories
p/n 1494-0059 Rack slide kit
E3663AC Support rails for Agilent rack cabinets

Agilent Models: 6625A, 6626A, 6628A, 6629A



More detailed specifications at **www.agilent.com/find/6620**

Low-Profile Modular Power System
20-300 W GPIB, LAN, USB, LXI Class C

N6700B, N6701A, N6702A, N6731-36B, N6741B-46B, N6751A-N6754A, N6761A-62A, N6773A-N6777A

- Small size: up to 4 outputs in 1U of rack space
- More than 30 DC power modules: basic, performance and precision models
- Fast output programming with active downprogramming
- Ultra fast command processing time
- Output sequencing and advanced triggering system
- Optional LIST mode, built-in digitizer, and disconnect and polarity reversal relays

The Agilent N6700 low-profile modular power system (MPS) is a switching regulated, multiple-output programmable DC power supply system with the performance of a linear power supply. The N6700 is a flexible modular platform that allows you to mix and match more than 30 different DC power modules to create a 1- to 4-channel DC power system to optimized performance, power and price to match test needs. Test system engineers can invest in high-performance outputs where speed and accuracy are needed, or purchase basic performance outputs for simple DC power requirements.

Small size

The Agilent N6700 MPS uses an advanced switching power supply design that fits within 1U of rack space. It has side air vents (no top or bottom air vents) so other instruments can be mounted directly above or below it. (Requires rack mount kit).

Protection features

Each N6700 module is protected against over-voltage, over-current, and over-temperature. A fault condition in one module can be detected within 10 microseconds by other modules so that they can be quickly shut down to avoid hazardous conditions on your DUT.

Specifications (at 0° to 55°C, and derated above 40°C)		N6751A	N6752A	N6753A	N6754A	N6755A NEW	N6756A NEW
DC output ratings							
Voltage		50 V	50 V	20 V	60 V	20 V	60 V
Current[1]		5 A	10 A	50 A	20 A	50 A	17 A
Power		50 W	100 W	300 W	300 W	500 W	500 W
Programming accuracy (at 23°C ±5°C after 30 minute warm-up. Applies from minimum to maximum programming range)							
Voltage	0.06% +	19 mV	19 mV	10 mV	25 mV	10 mV	25 mV
Current	0.1% +	20 mA	20 mA	30 mA	12 mA	30 mA	12 mA
Voltmeter/ammeter measurement accuracy (at 23°C ±5°C)							
Voltage	0.05% +	20 mV	20 mV	10 mV	25 mV	10 mV	25 mV
Current	0.1% +	4 mA	4 mA	30 mA	8 mA	30 mA	8 mA
Output ripple and noise (PARD) (from 20 Hz to 20 MHz)							
CV peak-to-peak		4.5 mV	4.5 mV	5 mV	6 mV	5 mV	6 mV
CV rms		350 µV	350 µV	1 mV	1 mV	1 mV	1 mV
Load effect (Regulation) (Applies for any output load change, with a maximum load-lead drop of 1 V/lead. The load lead drop reduces the maximum available voltage at the load.)							
Voltage		2 mV	2 mV	2 mV	2 mV	2 mV	2 mV
Current		2 mA	2 mA	12 mA	5 mA	12 mA	5 mA
Source effect (Regulation)							
Voltage		1 mV	1 mV	0.5 mV	1.2 mV	0.5 mV	1.2 mV
Current		1 mA	1 mA	5 mA	2 mA	5 mA	2 mA
Load transient recovery time (Time to recover to within the settling band following a load change.) - from 60% to 100% and from 100% to 60% of full load for model N6751A - from 50% to 100% and from 100% to 50% of full load for models N6752A though N6756A							
Voltage settling band		±75 mV	±75 mV[2]	±30 mV[3]	±90 mV[4]	±30 mV[3]	±90 mV[4]
Time		<100 µs	<100 µs	<100 µs	<100 µs	<100 µs	<100 µs

1 Output current is derated 1% per °C above 40°C.

2 When relay option 761 is installed in Model N6752A, the settling band is ±125 mV.

3 When relay option 760 or 761 is installed on Model N6753A and N6755A, the settling band is ±200 mV.

4 When relay option 760 or 761 is installed on Model N6754A and N6756A, the settling band is ±350 mV.

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-300 W GPIB (Continued)

Connectivity
The N6700 offers many system oriented features to simplify and accelerate test system development. They support the industry standard SCPI commands and come standard with software drivers.

The N6700 MPS comes standard with GPIB, USB 2.0, and 10/100 Base-T Ethernet LAN interfaces. While GPIB is best suited for use with existing systems, Agilent offers USB and LAN to allow you to take advantage of the availability, speed, and ease-of-use of common computer industry standard interfaces.

The N6700 is designed to comply with the LXI class C specification. The N6700 contains a Web server that provides Web pages for monitor, control and setup of the MPS.

Output sequencing
Each DC power module can be individually set to turn on or to turn off with a delay. By adjusting the delay times and then commanding the N6700 to turn on/off, you can set the N6700 modules to sequence on/off in a particular order.

Programmable voltage slew
For some applications, like inrush limiting or powering rate-sensitive devices, it is necessary to slow down and control the speed of the power supply to maintain a specific voltage slew rate. The N6700 provides programmable voltage slew rate, so that with a single command, you can generate a zero to full-scale voltage change controllable from 1 millisecond to 10 seconds.

Specifications (at 0° to 55°C, and derated above 40°C)

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)

	N6751A	N6752A	N6753A	N6754A	N6755A (NEW)	N6756A (NEW)
Programming range						
Voltage	20 mV - 51 V	20 mV - 51 V	10 mV - 20.4 V	25 mV - 61.2 V	10 mV - 20.4 V	25 mV - 61.2 V
Current	10 mA - 5.1 A	10 mA - 10.2 A	50 mA - 51 A	20 mA - 20.4 A	50 mA - 51 A	20 mA - 17.3 A
Programming resolution						
Voltage	3.5 mV	3.5 mV	1.5 mV	4.2 mV	1.5 mV	4.2 mV
Current	3.25 mA	3.25 mA	16.3 mA	6.5 mA	16.3 mA	6.5 mA
Measurement resolution						
Voltage	1.8 mV	1.8 mV	0.8 mV	2.2 mV	0.8 mV	2.2 mV
Current	410 µA	410 µA	2.05 mA	0.82 mA	2.05 mA	0.82 mA
Programming temperature coefficient per °C						
Voltage	18 ppm + 160 µV	18 ppm + 160 µV	35 ppm + 100 µV	35 ppm + 170 µV	35 ppm + 100 µV	35 ppm + 170 µV
Current	100 ppm + 45 µA	100 ppm + 45 µA	60 ppm + 500 µA	60 ppm + 200 µA	60 ppm + 500 µA	60 ppm + 200 µA
Measurement temperature coefficient per °C						
Voltage	25 ppm + 35 µV	25 ppm + 35 µV	50 ppm + 85 µV	50 ppm + 100 µV	50 ppm + 85 µV	50 ppm + 100 µV
Current 60 ppm +	3 µA	3 µA	30 µA	12 µA	30 µA	12 µA
N6705 mainframe oscilloscope measurement accuracy: (at 23°C ±5°C, accuracy of any individual point in the trace)						
Voltage 0.05% +	32 mV	32 mV	15 mV	37 mV	15 mV	37 mV
Current - with correction on[1]	0.1% + 14 mA	0.1% + 14 mA	N/A	N/A	N/A	N/A
Current 0.1% +	8 mA	8 mA	52 mA	17 mA	52 mA	17 mA
Up-programming time with full resistive load: (Time from 10% to 90% of total voltage excursion)						
Small voltage step	0 V to 10 V	0 V to 10 V	0 V to 6 V	0 V to 15 V	0 V to 10 V	0 V to 29 V
Time	0.2 ms	0.2 ms	0.4 ms	0.35 ms	0.5 ms	0.7 ms
Large voltage step	0 V to 50 V	0 V to 50 V	0 V to 20 V	0 V to 60 V	0 V to 20 V	0 V to 60 V
Time	1.5 ms	1.5 ms	1.5 ms	2 ms	1.5 ms	2 ms
Up-programming settling time with full resistive load: (Time from start of voltage change to within 0.1% of full scale value)						
Small voltage step	0 V to 10 V	0 V to 10 V	0 V to 6 V	0 V to 15 V	0 V to 10 V	0 V to 29 V
Time	0.5 ms	0.5 ms	0.8 ms	0.8 ms	1.0 ms	1.4 ms
Large voltage step	0 V to 50 V	0 V to 50 V	0 V to 20 V	0 V to 60 V	0 V to 20 V	0 V to 60 V
Time	4 ms	4 ms	3 ms	4.2 ms	3 ms	4.2 ms
Down-programming time with no load: (Time from start of voltage change to output voltge <0.5 V)						
Small voltage step	10 V to 0 V	10 V to 0 V	6 V to 0 V	15 V to 0 V	10 V to 0 V	29 V to 0 V
Time	0.3 ms	0.3 ms	0.55 ms	0.6 ms	1.0 ms	1.2 ms
Large voltage step	50 V to 0 V	50 V to 0 V	20 V to 0 V	60 V to 0 V	20 V to 0 V	60 V to 0 V
Time	1.3 ms	1.3 ms	1.8 ms	2.2 ms	1.8 ms	2.2 ms

[1] Correction On compensates for current flowing into the output capacitor during voltage transients

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-300 W GPIB (Continued)

High-speed test extensions
To make your testing go even faster, the N6700 offers high-speed test extensions (HSTE) which comes standard on the N6760 and optional on the N6730/40/50/70 families. This enhancement to the N6700 DC power modules extends the capabilities to include features similar to a built-in arbitrary waveform generator and a built-in oscilloscope. Through the LIST mode of HSTE, you can download up to 512 setpoints of voltage and current. In LIST mode, you can program the output to execute a LIST of voltage and current setpoints. For each setpoint, a dwell time can be specified and the power supply will stay (i.e., dwell) at that setpoint for the programmed dwell time value.

The HSTE also provides an oscilloscope-like digitizer built into the power module to capture voltage and current measurements.

Power management feature allows you to allocate mainframe power
To further optimize your investment you may choose to save money configuring a system where the sum of the power modules installed in a mainframe exceeds the total power available from the mainframe. In this case, the new power management features of the N6700 allows you to allocate mainframe power to the outputs where it's needed and reduce power to the outputs where it is not needed, achieving maximum asset utilization and flexibility. This feature provides the safety from unexpected and dangerous shut-downs that can occur with power systems without power management when operated in a similar way.

Specifications (at 0° to 55°C, and derated above 40°C)

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)

		N6751A	N6752A	N6753A	N6754A	N6755A NEW	N6756A NEW
Down-programming settling time with no load: (Time from start of voltage change to within 0.1% of full scale value)							
Small voltage step		10 V to 0 V	10 V to 0 V	6 V to 0 V	15 V to 0 V	10 V to 0 V	29 V to 0 V
Time		0.45 ms	0.45 ms	0.8 ms	0.8 ms	1.3 ms	1.5 ms
Large voltage step		50 V to 0 V	50 V to 0 V	20 V to 0 V	60 V to 0 V	20 V to 0 V	60 V to 0 V
Time		1.4 ms	1.4 ms	2 ms	2.3 ms	2 ms	2.3 ms
Down-programming time with capacitive load: (Time from start of voltage change to output voltage <0.5)							
Small voltage step		10 V to 0 V	10 V to 0 V	6 V to 0 V	15 V to 0 V	10 V to 0 V	29 V to 0 V
Time		2.1 ms	2.1 ms	2.2 ms	2.3 ms	4.5 ms	5.5 ms
Large voltage step		50 V to 0 V	50 V to 0 V	20 V to 0 V	60 V to 0 V	20 V to 0 V	60 V to 0 V
Time		11 ms	11 ms	8.5 ms	10 ms	8.5 ms	10 ms
Capacitive load[2]		1000 µF	1000 µF	4700 µF	680 µF	4700 µF	680 µF
Down-programming capability							
Continuous power		7 W	7 W	12.5 W	12.5 W	12.5 W	12.5 W
Peak current		7 A	7 A	15 A	6 A	15 A	6 A
Over-voltage protection							
Accuracy	0.25% +	0.25 V	0.25 V	0.15 V	0.3 V	0.15 V	0.3 V
Accuracy w/option 761	0.25% +	0.25 V	0.25 V	0.45 V	0.6 V	0.45 V	0.6 V
Accuracy w/option 760	0.25% +	N/A	N/A	0.45 V	0.6 V	0.45 V	0.6 V
Maximum setting		55 V	55 V	22 V	66 V	22 V	66 V
Response time		50 µs from occurance of over-voltage condition to start of output shutdown					
Output ripple and noise: (PARD)							
CC rms		2 mA	2 mA	10 mA	4 mA	10 mA	4 mA
Common mode noise: (from 20 Hz - 20 MHz; from either output to chassis)							
Rms		500 µA	500 µA	500 µA	750 µA	500 µA	750 µA
Peak-to-peak		< 2 mA	< 2 mA	< 2 mA	< 3 mA	< 2 mA	< 3 mA
Remote sense capability: Outputs can maintain specifications with up to a 1 - volt drop per load lead. The load lead drop reduces the maximum available voltage at the load.							
Series and parallel operation: Identically rated outputs can be operated in parallel or be connected for straight series operation. Auto-series and auto-parallel operation is not available.							
Minimum output turn-on delay							
Without relay option		25 ms	25 ms	18 ms	18 ms	18 ms	18 ms
Without relay option 760		51 ms	51 ms	44 ms	44 ms	44 ms	44 ms

[2] Modules can discharge the specified capacitive load from full scale to 0 V at a rate of 4 times/second

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-500 W GPIB (Continued)

Series and parallel operation
To increase the available power, identical models can be operated in series for greater output voltage or in parallel for greater output current.

To simplify parallel operation, the N6700 offers virtual channels, a firmware based feature that allows the N6700 system to treat up to 4 channels as a single, synchronized channel. Once configured, all functions (sourcing, measurements, triggering, protection, and status monitoring) behave as if there is 1 channel of up to 4 times the capacity of a single channel, without writing a single line of code to manage the interaction and synchronization of the paralleled power supplies.

Triggering
The N6700 MPS mainframe has hardware trigger in/trigger out signals which permit the N6700 to be synchronized with external events.

Output disconnect relays
Modules in the N6700 can be individually ordered with optional Output Disconnect Relays (option 761) or Output Disconnect/Polarity Reversal Relays (option 760). With option 761, Output Disconnect Relays, mechanical relays disconnect both the plus and minus side of the power supply, including the sense leads. With option 760, Output Disconnect/Polarity Reversal Relays switch the leads on both the plus and minus side of the power supply, including the sense leads, resulting in a voltage polarity reversal at the DUT.

Specifications (at 0° to 55°C, and derated above 40°C)	N6761A	N6762A	N6763A NEW	N6764A NEW	N6765A NEW	N6766A NEW
DC output ratings						
Voltage	50 V	50 V	20 V	60 V	20 V	60 V
Current[1]	1.5 A	3 A	50 A	20 A	50 A	17 A
Power	50 W	100 W	300 W	300 W	500 W	500 W
Low programming ranges (V & I)	5.5 V; 100 mA	5.5 V; 100 mA	N/A	N/A	N/A	N/A
Low measurement ranges (V & I)	5.5 V; 100 mA	5.5 V; 100 mA	2 V; 1.5 A	6 V; 0.5 A	2 V; 1.5 A	6 V; 0.5 A
Programming accuracy (at 23°C ±5°C after 30 minute warm-up. Applies from minimum to maximum programming range)						
Voltage, high range	0.016% + 6 mV	0.016% + 6 mV	0.03% + 5 mV	0.03% + 12 mV	0.03% + 5 mV	0.03% + 12 mV
Voltage, low range	0.016% + 1.5 mV	0.016% + 1.5 mV	N/A	N/A	N/A	N/A
Current, high range	0.04% + 200 µA	0.04% + 200 µA	0.1% + 15 mA	0.075% + 4 mA	0.1% + 15 mA	0.075% + 4 mA
Current, low range (@ 0-7 V)	0.04% + 30 µA	0.04% + 30 µA	N/A	N/A	N/A	N/A
(@ 7-50 V)	0.04% + 55 µA	0.04% + 55 µA				
Voltmeter/ammeter measurement accuracy (at 23°C ±5°C)						
Voltage, high range	0.016% + 6 mV	0.016% + 6 mV	0.03% + 10 mV	0.03% + 25 mV	0.03% + 10 mV	0.03% + 25 mV
Voltage, low range	0.016% + 1.5 mV	0.016% + 1.5 mV	0.03% + 1.5 mV	0.03% + 5 mV	0.03% + 1.5 mV	0.03% + 5 mV
Current, high range	0.04% + 160 µA	0.04% + 160 µA	0.1% + 10 mA	0.1% + 5 mA	0.1% + 10 mA	0.1% + 5 mA
Current, low range	0.03% + 15 µA (@ 0-7 V)[2]	0.03% + 15 µA (@ 0-7 V)[2]	0.05% + 1.1 mA[3]	0.05% + 0.75 mA[3]	0.05% + 1.1 mA[3]	0.05% + 0.75 mA[3]
	0.03% + 55 µA (@ 7-50 V)	0.03% + 55 µA (@ 7-50 V)				
200 µA current range (option 2UA)	0.5% + 100 nA	0.5% + 100 nA	N/A	N/A	N/A	N/A
Output ripple and noise (PARD): (from 20 Hz to 20 MHz)						
CV peak-to-peak	4.5 mV	4.5 mV	5 mV	6 mV	5 mV	6 mV
CV rms	0.35 mV	0.35 mV	1 mV	1 mV	1 mV	1 mV
Load effect (Regulation): (Applies for any output load change, with a maximum load-lead drop of 1 V/ lead. The load lead drop reduces the maximum available voltage at the load.)						
Voltage	0.5 mV	0.5 mV	2 mV	2 mV	2 mV	2 mV
Current	30 µA (@ 0-7 V)	30 µA (@ 0-7 V)	12 mA	5 mA	12 mA	5 mA
	65 µA (@ 7-50 V)	65 µA (@ 7-50 V)				

1 Output current is derated 1% per °C above 40°C.

2 Applies when measuring 4096 data points (SENSe:SWEep:POINts = 4096).

3 Applies when measuring currents that remain within the low range. Due to thermal settling, when transitioning from measuring full-rated output current (the worst case), to measuring the current within the low range, the low range accuracy specification is typically met within 5 seconds after the current has transitioned into the low range. Accuracies within this 5 second settling period are typically 2X the specified accuracy or better.

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-500 W GPIB (Continued)

Universal AC input
The N6700 has a universal input that operates from 100-240 VAC, 50/60/400 Hz. There are no switches to set or fuses to change when switching from one voltage standard to another. The AC input employs power factor correction.

Choosing the Right DC Power Modules to Meet Your ATE Needs
DC power supply modules for the N6700 system are available in Basic, High-Performance and Precision models. Basic DC power modules provide programmable voltage and current, measurement and protection features at a very economical price, making these modules suitable to power the DUT or to provide power for ATE system resources such as fixture control. High-Performance, DC power modules provide low noise, high accuracy and programming speeds that are up to 10 to 50 times faster than other programmable power supplies. Precision DC power modules provide precise control and measurements in the milliampere and microampere region with the ability to simultaneously digitize voltage and current, and capture those measurements in an oscilloscope-like data buffer.

Modules with autoranging output capability that extends the available voltage or current range while staying within a module's power rating, enables one power supply to do the job of several traditional power supplies.

Specifications (at 0° to 55°C, and derated above 40°C)	N6761A	N6762A	N6763A NEW	N6764A NEW	N6765A NEW	N6766A NEW
Source effect (Regulation)						
Voltage	0.5 mV	0.5 mV	0.5 mV	1.2 mV	0.5 mV	1.2 mV
Current	30 µA	30 µA	5 mA	2 mA	5 mA	2 mA
Load transient recovery time						
Time to recover to within the settling band following a load change - from 60% to 100% and from 100% to 60% of full load for model N6761A - from 50% to 100% and from 100% to 50% of full load for model N6762A though N6766A)						
Voltage settling band	± 75 mV	± 75 mV	± 30 mV[4]	± 90 mV[5]	± 30 mV[4]	± 90 mV[5]
Time	< 100 µs	< 100 µs	< 100 µs	< 100 µs	< 100 µs	< 100 µs

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)						
Programming range						
Voltage, high range	15 mV - 51 V	15 mV - 51 V	10 mV - 20.4 V	25 mV - 61.2 V	10 mV - 20.4 V	25 mV - 61.2 V
Voltage, low range	12 mV - 5.5 V	12 mV - 5.5 V	N/A	N/A	N/A	N/A
Current, high range	1 mA - 1.53 A	1 mA - 3.06 A	50 mA - 51 A	20 mA - 20.4 A	50 mA - 51 A	20 mA - 17.3 A
Current, low range	0.1 mA - 0.1 A[6]	0.1 mA - 0.1 A[6]	N/A	N/A	N/A	N/A
Programming resolution						
Voltage, high range	880 µV	880 µV	1.5 mV	4.2 mV	1.5 mV	4.2 mV
Voltage, low range	90 µV	90 µV	N/A	N/A	N/A	N/A
Current, high range	60 µA	60 µA	16.3 mA	6.5 mA	16.3 mA	6.5 mA
Current, low range	2 µA	2 µA	N/A	N/A	N/A	N/A
Measurement resolution						
Voltage, high range	440 µV	440 µV	250 µV	600 µV	250 µV	600 µV
Voltage, low range	44 µV	44 µV	25 µV	60 µV	25 µV	60 µV
Current, high range	30 µA	30 µA	500 µA	250 µA	500 µA	250 µA
Current, low range	1 µA	1 µA	20 µA	10 µA	20 µV	10 µA
200 µA current range (Option 2UA)	4 nA	4 nA	N/A	N/A	N/A	N/A
Programming temperature coefficient per °C						
Voltage, high range	18 ppm + 140 µV	18 ppm + 140 µV	23 ppm + 95 µV	23 ppm + 218 µV	23 ppm + 95 µV	23 ppm + 218 µV
Voltage, low range	40 ppm + 70 µV	40 ppm + 70 µV	N/A	N/A	N/A	N/A
Current, high range	33 ppm + 10 µA	33 ppm + 10 µA	25 ppm + 129 µA	25 ppm + 52 µA	25 ppm + 129 µA	25 ppm + 52 µA
Current, low range	60 ppm + 1.5 µA	60 ppm + 1.5 µA	N/A	N/A	N/A	N/A

4 When relay option 760 or 761 is installed on Model N6763A and N6765A, the settling band is ± 200 mV.

5 When relay option 760 or 761 is installed on Model N6764A and N6766A, the settling band is ± 350 mV.

6 If you are operating the unit below 255 µA in constant current mode, the output may become unregulated with the following load conditions: The load resistance is <175 mΩ and the load inductance is > 20 µH. If this occurs, an UNRegulated flag will be generated and the output current may rise above the programmed value but will remain less than 255 µA.

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-500 W GPIB (Continued)

N6750 family
The Agilent N6750 family of high-performance, autoranging DC power modules provides low noise, high accuracy and includes, auto-ranging output capabilities enabling one power supply to do the job of several traditional power supplies.

N6760 family
The Agilent N6760 family of precision DC power modules provides precise control and measurements in the milliampere and microampere region with the ability to simultaneously digitize voltage and current, and capture those measurements in an oscilloscope-like data buffer. The N6761A/N6762A precision DC power modules offer dual ranges on both programming and measurement while the N6763A-N6766A offer dual measurement ranges. All are ideally suited for semiconductor and passive device testing.

N6750/60 low noise outputs
This switching power supply outperforms most linear power supplies on the market with low normal and common mode noise.

Specifications (at 0° to 55°C, and derated above 40°C)

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)

	N6761A	N6762A	N6763A NEW	N6764A NEW	N6765A NEW	N6766A NEW
Measurement temperature coefficient per °C						
Voltage, high range	23 ppm + 40 µV	23 ppm + 40 µV	23 ppm + 53 µV	23 ppm + 73 µV	23 ppm + 53 µV	23 ppm + 73 µV
Voltage, low range	30 ppm + 40 µV	30 ppm + 40 µV	25 ppm + 53 µV	25 ppm + 73 µV	25 ppm + 53 µV	25 ppm + 73 µV
Current, high range	40 ppm + 0.3 µA	40 ppm + 0.3 µA	25 ppm + 21 µA	25 ppm + 7 µA	25 ppm + 21 µA	25 ppm + 7 µA
Current, low range	50 ppm + 0.3 µA	50 ppm + 0.3 µA	27 ppm + 21 µA	27 ppm + 7 µA	27 ppm + 21 µA	27 ppm + 7 µA
200 µA current range (option 2UA)	100 ppm + 3 nA/°C	100 ppm + 3 nA/°C	N/A	N/A	N/A	N/A
N6705 mainframe oscilloscope measurement accuracy: (at 23°C ±5°C, accuracy of any individual point in the trace)						
Voltage	0.016% + 16 mV	0.016% + 16 mV	0.03% + 13 mV	0.03% + 32 mV	0.03% + 13 mV	0.03% + 32 mV
Current, high range (with Correction On[1])	0.04% + 10 mA	0.04% + 10 mA	N/A	N/A	N/A	N/A
Current, high range	0.04% + 1 mA	0.04% + 1 mA	0.1% + 16 mA	0.1% + 8.4 mA	0.1% + 16 mA	0.1% + 8.4 mA
Current, low range	0.03% + 0.175 mA	0.03% + 0.175 mA	0.05% + 6.6 mA	0.05% + 2.6 mA	0.05% + 6.6 mA	0.05% + 2.6 mA
Up-programming time with full resistive load: (time from 10% to 90% of total voltage excursion)						
Small voltage step	0 V to 10 V	0 V to 10 V	0 V to 6 V	0 V to 15 V	0 V to 10 V	0 V to 29 V
Time	0.6 ms	0.6 ms	0.4 ms	0.35 ms	0.5 ms	0.7 ms
Large voltage step	0 V to 50 V	0 V to 50 V	0 V to 20 V	0 V to 60 V	0 V to 20 V	0 V to 60 V
Time	2.2 ms	2.2 ms	1.5 ms	2 ms	1.5 ms	2 ms
Up-programming settling time with full resistive load: (time from start of voltage change to within 0.1% of full scale value)						
Small voltage step	0 V to 10 V	0 V to 10 V	0 V to 6 V	0 V to 15 V	0 V to 10 V	0 V to 29 V
Time	0.9 ms	0.9 ms	0.8 ms	0.8 ms	1.0 ms	1.4 ms
Large voltage step	0 V to 50 V	0 V to 50 V	0 V to 20 V	0 V to 60 V	0 V to 20 V	0 V to 60 V
Time	4 ms	4 ms	3 ms	4.2 ms	3 ms	4.2 ms
Down-programming time with no load: (time from start of voltage change to output voltge <0.5 V)						
Small voltage step	10 V to 0 V	10 V to 0 V	6 V to 0 V	15 V to 0 V	10 V to 0 V	29 V to 0 V
Time	0.3 ms	0.3 ms	0.55 ms	0.6 ms	1.0 ms	1.2 ms
Large voltage step	50 V to 0 V	50 V to 0 V	20 V to 0 V	60 V to 0 V	20 V to 0 V	60 V to 0 V
Time	1.3 ms	1.3 ms	1.8 ms	2.2 ms	1.8 ms	2.2 ms
Down-programming setting time with no load: (time from start of voltage change to within 0.1% of full scale value)						
Small voltage step	10 V to 0 V	10 V to 0 V	6 V to 0 V	15 V to 0 V	10 V to 0 V	29 V to 0 V
Time	0.45 ms	0.45 ms	0.8 ms	0.8 ms	1.3 ms	1.5 ms
Large voltage step	50 V to 0 V	50 V to 0 V	20 V to 0 V	60 V to 0 V	20 V to 0 V	60 V to 0 V
Time	1.4 ms	1.4 ms	2 ms	2.3 ms	2 ms	2.3 ms

[1] Correction On compensates for current flowing into the output capacitor during voltage transients

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-500 W GPIB (Continued)

Specifications
(at 0° to 55°C, and derated above 40°C)

N6750/60 output programming speed
The N6750/60 achieves performance unlike a typical DC power supply with up to 10 to 50 times faster than other programmable power supplies. Thanks to an active down-programming circuit to rapidly pull down the output when lowering the module's output voltage, the N6750/60 can rapidly program both up and down in voltage. These output speeds allow the N6750/60 to give maximum system throughput when your test calls for frequent changes in power supply voltage settings.

N6750/60 autoranging for flexibility
The N6750/60 gives test system designers even more flexibility by providing autoranging outputs. This autoranging capability provides maximum output power at any output voltage up to 50 V. This allows one power supply to do the job of several power supplies because its operating range covers low voltage, high current as well as high voltage, low current operating points.

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)

		N6761A	N6762A	N6763A NEW	N6764A NEW	N6765A NEW	N6766A NEW
Down-programming time with capacitive load: (time from start of voltage change to output voltge <0.5 V)							
Small voltage step		10 V to 0 V	10 V to 0 V	6 V to 0 V	15 V to 0 V	10 V to 0 V	29 V to 0 V
Time		4.5 ms	4.5 ms	2.2 ms	2.3 ms	4.5 ms	5.5 ms
Large voltage step		50 V to 0 V	50 V to 0 V	20 V to 0 V	60 V to 0 V	20 V to 0 V	60 V to 0 V
Time		23 ms	23 ms	8.5 ms	10 ms	8.5 ms	10 ms
Capacitive load[2]		1000 µF	1000 µF	4700 µF	680 µF	4700 µF	680 µF
Down-programming capability							
Continuous power		7 W	7 W	12.5 W	12.5 W	12.5 W	12.5 W
Peak current		3.8 A	3.8 A	15 A	6 A	15 A	6 A
Over-voltage protection							
Accuracy	0.25% +	0.25 V	0.25 V	0.15 V	0.3 V	0.15 V	0.3 V
Accuracy w/option 761	0.25% +	0.25 V	0.25 V	0.45 V	0.6 V	0.45 V	0.6 V
Accuracy w/option 760	0.25% +	N/A	N/A	0.45 V	0.6 V	0.45 V	0.6 V
Maximum setting		55 V	55 V	22 V	66 V	22 V	66 V
Response time		50 µs from occurance of over-voltage condition to start of output shutdown					
Output ripple and noise: (PARD)							
CC rms		2 mA	2 mA	10 mA	4 mA	10 mA	4 mA
Common mode noise: (from 20 Hz to 20 MHz; from either output to chassis)							
Rms		500 µA	500 µA	500 µA	750 µA	500 µA	750 µA
Peak-to-peak		<2 mA	<2 mA	<2 mA	<3 mA	<2 mA	<3 mA
Remote sense capability: Outputs can maintain specifications with up to a 1 - volt drop per load lead. The load lead drop reduces the maximum available voltage at the load.							
Series and parallel operation: Identically rated outputs can be operated in parallel or be connected for straight series operation. Auto-series and auto-parallel operation is not available.							
Minimum output turn-on delay: Time from when any Output On command is received until the output starts turning on.							
Without relay option		32 ms[3]	32 ms[3]	18 ms	18 ms	18 ms	18 ms
Without relay option 760		58 ms[3]	58 ms[3]	44 ms	44 ms	44 ms	44 ms

[2] Modules can discharge the specified capacitive load from full scale to 0 V at a rate of 4 times/second.
[3] In Current priority mode, minimum delay is 23 ms without relays and 45 ms with relay Option 760.

Low-Profile Modular Power System
20-500 W GPIB (Continued)

N6730/40/70 family
The Agilent N6730, N6740, and N6770 families of DC power modules provide programmable voltage and current, measurement and protection features at a very economical price, making these modules suitable to power the DUT or to provide power for ATE system resources, such as fixture control. The N6730/40/70 families give you clean, reliable DC power without advanced features, plus gives you the added benefits of being a part of the N6700 MPS including small size (true 1U), mix-and-match with other N6700 DC power modules when you need performance along with basic DC outputs, connectivity via LAN, USB, and GPIB, and fast command processing time of less than 1 ms.

Specifications (at 0° to 55°C, and derated above 40°C)		N6773A	N6774A	N6775A	N6776A	N6777A (NEW)
DC utput ratings						
Voltage		20 V	35 V	60 V	100 V	150 V
Current[1]		15 A[2]	8.5 A	5 A	3 A	2 A
Power		300 W	300 W	300 W	300 W	300 W
Programming accuracy: (at 25°C ±5°C after 30 minute warm-up. Applies from minimum to maximum programming range)						
Voltage	0.1% +	20 mV	35 mV	60 mV	100 mV	150 mV
Current	0.15% +	60 mA	60 mA	60 mA	30 mA	30 mA
Voltmeter/ammeter measurement accuracy: (at 25°C ±5°C)						
Voltage	0.1% +	20 mV	35 mV	60 mV	100 mV	150 mV
Current	0.15% +	15 mA	12 mA	12 mA	6 mA	6 mA
Output ripple an noise (PARD): (from 20 Hz tp 20 MHz))						
CV peak-to-peak		20 mV	22 mV	35 mV	45 mV	68 mV
CV rms		3 mV	5 mV	9 mV	18 mV	27 mV
Load effect (Regulation): (Applies for any output load change, with a maximum load-lead drop of 1 V/lead. The load lead drop reduces the maximum available voltage at the load.)						
Voltage		13 mV	16 mV	24 mV	45 mV	68 mV
Current		6 mA	6 mA	6 mA	6 mA	6 mA
Source effect (Regulation)						
Voltage		2 mV	4 mV	6 mV	10 mV	15 mV
Current		1 mA	1 mA	1 mA	1 mA	1 mA
Load transient recovery time: (Time to recover to within the settling band following a load change from 50% to 100% and from 100% to 50% of full load.)						
Voltage settling time		±0.3 V[3]	±0.3 V[3]	±0.5 V	±1.0 V	±2.0 V
Time		<250 µs	<250 µs	<250 µs	<250 µs	<250 µs
Supplemental Characteristics	(Non-warranted characteristics determined by design that are useful in applying the product)					
Programming ranges						
Voltage		30 mV - 20.4 V	40 mV - 35.7 V	70 mV - 61.2 V	100 mV - 102 V	145 mV - 153 V
Current		30 mA - 15.3 A	15 mA - 8.67 A	7.5 mA - 5.1 A	4.5 mA - 3.06 A	2.75 mA - 2.04 A
Programming resolution						
Voltage		7 mV	10 mV	18 mV	28 mV	43 mV
Current		9 mA	6 mA	3 mA	1.5 mA	1 mA
Measurement resolution						
Voltage		10 mV	18 mV	30 mV	50 mV	77 mV
Current		9 mA	6 mA	3 mA	1.5 mA	1 mA

[1] Output current is derated 1% per °C above 40 °C.
[2] When relay option 760 is installed in Model N6773A, the output current is limited to 10 A.
[3] When relay option 760 or 761 is installed, the settling band is ±0.35 V.

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-500 W GPIB (Continued)

Specifications
(at 0° to 55°C, and derated above 40°C)

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC from chassis ground

Remote sensing: Output can maintain specifications with up to 1-volt drop per load lead

Command processing time: Average time required for the output voltage to begin to change following receipt of digital data is ≤ 1ms.

High speed test extentions:

List mode:

- Number of steps = 1 to 512
- Dwell time = 1 to 262 s
- Maximum list repetitions = 256 or infinite

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)

		N6773A	N6774A	N6775A	N6776A	N6777A (NEW)
Programming temperature coefficient per °C						
Voltage	0.01% +	0.2 mV	0.5 mV	0.5 mV	1 mV	1 mV
Current	0.01% +	0.5 mA	0.5 mA	0.1 mA	0.1 mA	0.1 mA
Measurement temperature coefficient per °C						
Voltage	0.01% +	0.2 mV	0.2 mV	0.5 mV	0.5 mV	0.5 mV
Current	0.01% +	0.5 mA	0.5 mA	0.05 mA	0.05 mA	0.05 mA
N6705 mainframe oscilloscope measurement accuracy: (at 25°C ±5°C, accuracy of any individual point in the trace)						
Voltage	0.1% +	45 mV	75 mV	120 mV	160 mV	175 mV
Current - with Correction On[1]	0.15% +	35 mA	22 mA	19 mA	9 mA	9 mA
Current	0.15% +	45 mA	27 mA	22 mA	12 mA	12 mA
Up-programming and down-programming time with full resisitive load: (Time from 10% to 90% of total voltage excursion; for voltage setting from 0 V to full scale and full scale to 0 V)						
Time		20 ms	20 ms	20 ms	20 ms	20 ms
Maximum up-programming and down-programming settling time with full resisitive load: (Time from start of voltage change to within 0.1% of full scale value; for voltage setting from 0 V to full scale and full scale to 0 V)						
Time		100 ms	100 ms	100 ms	100 ms	100 ms
Over-voltage protection:						
Accuracy	0.25% +	100 mV	130 mV	260 mV	650 mV	650 mV
Accuracy w/opt. 761	0.25% +	500 mV	350 mV	350 mV	650 mV	650 mV
Accuracy w/opt. 760	0.25% +	700 mV	700 mV	400 mV	650 mV	650 mV
Maximum setting		22 V	38.5 V	66 V	110 V	165 V
Response time (50 µs from occurance of over-voltage condition to start of output shutdown)						
Output ripple and noise (PARD)						
CC rms		6 mA	6 mA	6 mA	6 mA	6 mA
Common mode noise: (from 20 Hz - 20 MHz; from either output to chassis						
Rms		2 mA	2 mA	2 mA	2 mA	2 mA
Peak-to-peak		< 20 mA	< 20 mA	< 20 mA	< 20 mA	< 20 mA
Remote sense capability: Output can maintain specifications with up to a 1 volt drop per load lead. The load lead drop reduces the maximum available voltage at the load.						
Series and parallel operation: Identically rated outputs can be operated directly in parallel or can be connected for straight series operation. Auto series and auto-parallel operation is not available.						
Minimum output turn-on delay: Time from when any Output On command is received until the output starts turning on.						
Without relay option		32 ms	32 ms	32 ms	32 ms	32 ms
With relay option 760		58 ms	58 ms	58 ms	58 ms	58 ms

[1] Correction On compensates for current flowing into the output capacitor during voltage transients

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-300 W GPIB (Continued)

Digitizer:

- Measurement points = 1 to 512 K
- Sample rate = 0.000025 Hz up to 200 kHz

I/O interface:

GPIB, LAN, USB standard

Software driver:

- IVI-COM
- VXI*Plug&Play*

AC input:

- Input ratings: 100 – 240 VAC; 50/60/400 Hz
- Power consumption:
  - N6700B–1440 VA typical (with power factor correction)
  - N6701A–1440 VA typical (with power factor correction)
  - N6702A–1440 VA typical @ < 180 VAC input (with power factor correction)
  - N6702A–2200 VA typical @ > 180 VAC input (with power factor correction)

Regulatory compliance: European EMC directive 89/336/EEC for Class A products, Australian C-Tick mark, This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme à la norme NMB-001 du Canada. European Low Voltage Directive 73/23/EEC.

Size:

- Height 44.45 mm; 1.75 in
- Width 432.5 mm; 17.03 in
- Depth (including handles)
  585.6 mm; 23.06 in (N6700B/N6701A)
  633.9 mm; 24.96 in (N6702A)

Specifications (at 0° to 55°C, and derated above 40°C)	**N6731B**	**N6732B**	**N6733B**	**N6734B**	**N6735B**	**N6736B**
Output ratings						
Voltage	5 V	8 V	20 V	35 V	60 V	100 V
Current	10 A	6.25 A	2.5 A	1.5 A	0.8 A	0.5 A
Power	50 W	50 W	50 W	50 W	50 W	50 W
Programming accuracy[2] (at 23°C ±5°C)						
Voltage	0.1% + 19 mV	0.1% + 19 mV	0.1% + 20 mV	0.1% + 35 mV	0.1% + 60 mV	0.1% + 100 mV
Current	0.15% + 20 mA	0.15% + 20 mA	0.15% + 20 mA	0.15% + 20 mA	0.15% + 20 mA	0.15% + 10 mA
Readback accuracy (at 23°C ±5°C)						
Voltage	0.1% + 20 mV	0.1% + 20 mV	0.1% + 20 mV	0.1% + 35 mV	0.1% + 60 mV	0.1% + 100 mV
Current	0.15% + 20 mA	0.15% + 10 mA	0.15% + 5 mA	0.15% + 4 mA	0.15% + 4 mA	0.15% + 2 mA
Output ripple and noise (PARD) (from 20 Hz – 20 MHz)						
CV peak-to-peak	10 mV	12 mV	14 mV	15 mV	25 mV	30 mV
CV rms	2 mV	2 mV	3 mV	5 mV	9 mV	18 mV
Load regulation[1]						
Voltage	5 mV	6 mV	9 mV	11 mV	13 mV	20 mV
Current	2 mA	2 mA	2 mA	2 mA	2 mA	2 mA
Line regulation						
Voltage	1 mV	2 mV	2 mV	4 mV	6 mV	10 mV
Current	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA
Transient response time	(time to recover to within the settling band following a load change from 50% to 100% and from 100% to 50% of full load.)					
Voltage settling band	± 80 mV	± 80 mV	± 200 mV	± 200 mV	± 400 mV	± 500 mV
Time	200 µs	200 µs	200 µs	200 µs	200 µs	200 µs

1 With an output change from no load to full load, up to a maximum load-lead drop of 1 V per lead.
2 Applies from minimum to maximum programming range. (see Supplemental Characteristics)

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-300 W GPIB (Continued)

Weight:

- N6700B with 4 installed modules
  Net: 12.73 kg; 28 lbs.
- N6701A with 4 installed modules
  Net: 11.82 kg; 26 lbs.
- N6702A with 4 installed modules
  Net: 14.09 kg; 31 lbs.
- Single power module
  Net: 1.23 kg; 2.71 lbs.

Warranty:

One year

Specifications
(at 0° to 55°C, and derated above 40°C)

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)

	N6731B	N6732B	N6733B	N6734B	N6735B	N6736B
Programming resolution						
Voltage	3.5 mV	4 mV	7 mV	10 mV	18 mV	28 mV
Current	7 mA	4 mA	3 mA	2 mA	1 mA	0.5 mA
Output ripple and noise (PARD)						
CC rms	8 mA	4 mA	2 mA	2 mA	2 mA	2 mA
Over-voltage protection						
Accuracy (without relay option)	0.25% + 50 mV	0.25% + 50 mV	0.25% + 75 mV	0.25% + 100 mV	0.25% + 200 mV	0.25% + 250 mV
Response time	50 µs from occurence of 0 V condition to start of output shutdown					
Maximum up-programming and down-programming time with full resistive load: (time from 10% to 90% of total voltage excursion)						
Voltage setting from 0 V to full scale and full scale to 0 V	20 ms	20 ms	20 ms	20 ms	20 ms	20 ms
Maximum up-programming and down-programming settling time with full resistive load: (time from start of voltage change until voltage settles within 0.1% of the full-scale voltage of its final value)						
Voltage setting from 0 V to full scale and full scale to 0 V	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-300 W GPIB (Continued)

Specifications (at 0° to 55°C, and derated above 40°C)	N6741B	N6742B	N6743B	N6744B	N6745B	N6746B
Ouput ratings						
Voltage	5 V	8 V	20 V	35 V	60 V	100 V
Current	20 A	12.5 A	5 A	3 A	1.6 A	1 A
Power	100 W	100 W	100 W	100 W	100 W	100 W
Programming accuracy[2] (at 23°C ±5°C)						
Voltage	0.1% + 19 mV	0.1% + 19 mV	0.1% + 20 mV	0.1% + 35 mV	0.1% + 60 mV	0.1% + 100 mV
Current	0.15% + 20 mA	0.15% + 20 mA	0.15% + 20 mA	0.15% + 20 mA	0.15% + 20 mA	0.15% + 10 mA
Readback accuracy (at 23°C ±5°C)						
Voltage	0.1% + 20 mV	0.1% + 20 mV	0.1% + 20 mV	0.1% + 35 mV	0.1% + 60 mV	0.1% + 100 mV
Current	0.15% + 20 mA	0.15% + 10 mA	0.15% + 5 mA	0.15% + 4 mA	0.15% + 4 mA	0.15% + 2 mA
Output ripple and noise (PARD) (from 20 Hz – 20 MHz)						
CV peak-to-peak	11 mV	12 mV	14 mV	15 mV	25 mV	30 mV
CV rms	2 mV	2 mV	3 mV	5 mV	9 mV	18 mV
Load regulation[1]						
Voltage Current	5 mV 2 mA	6 mV 2 mA	9 mV 2 mA	11 mV 2 mA	16 mV 2 mA	30 mV 2 mA
Line regulation						
Voltage Current	1 mV 1 mA	2 mV 1 mA	2 mV 1 mA	4 mV 1 mA	6 mV 1 mA	10 mV 1 mA
Transient response time	(time to recover to within the settling band following a load change from 50% to 100% and from 100% to 50% of full load.)					
Voltage settling band	± 100 mV	± 100 mV	± 300 mV	± 300 mV	± 500 mV	± 1000 mV
Time	200 µs	200 µs	200 µs	200 µs	200 µs	200 µs
Programming resolution						
Voltage	3.5 mV	4 mV	7 mV	10 mV	18 mV	28 mV
Current	7 mA	4 mA	3 mA	2 mA	1 mA	0.5 mA
Output ripple and noise (PARD)						
CC rms	8 mA	4 mA	2 mA	2 mA	2 mA	2 mA
Over-voltage protection						
Accuracy (without relay option)	0.25% + 50 mV	0.25% + 50 mV	0.25% + 75 mV	0.25% + 100 mV	0.25% + 200 mV	0.25% + 250 mV
Response time	50 µs from occurence of O V condition to start of output shutdown					
Maximum up-programming and down-programming time with full resistive load: (time from 10% to 90% of total voltage excursion)						
Voltage setting from 0 V to full scale and full scale to 0 V	20 ms	20 ms	20 ms	20 ms	20 ms	20 ms
Maximum up-programming and down-programming settling time with full resistive load: (time from start of voltage change until voltage settles within 0.1% of the full-scale voltage of its final value)						
Voltage setting from 0 V to full scale and full scale to 0 V	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms

[1] With an output change from no load to full load, up tp a maximum load-lead drop of 1 V per lead.
[2] Applies from minimum to maximum programming range. (see Supplemental Characteristics)

More detailed specifications at **www.agilent.com/find/N6700**

Low-Profile Modular Power System
20-300 W GPIB (Continued)

Specifications (at 0° to 55°C, and derated above 40°C)	N6700B	N6701A	N6702A
Supplemental Characteristics (Non-warranted characteristics determined by design and useful in applying the product)			
Maximum total output power (= Sum of total module output power)	400 W when operating from 100 -240 VAC input	600 W when operating from 100 -240 VAC input	1200 W when operating from 200 -240 VAC input
			600 W when operating from 100 -120 VAC input

Ordering information

Options for N6700 mainframes

Opt 908 Rack mount kit

Opt FLR Filler panel kit

Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package

Opt 0L2 Extra copy of standard printed documentation package

Opt 0B0 Full documentation on CD-ROM only

Opt 900 Power cord, United Kingdom

Opt 901 Power cord, Australia

Opt 902 Power cord, Europe

Opt 903 Power cord, USA, Canada, 120 V

Opt 904 Power cord, USA, Canada, 240 V

Opt 906 Power cord, Switzerland

Opt 912 Power cord, Denmark

Opt 917 Power cord, South Africa, India

Opt 918 Power cord, Japan

Opt 919 Power cord, Israel

Opt 920 Power cord, Argentina

Opt 921 Power cord, Chile

Opt 922 Power cord, China

Opt 927 Power cord, Thailand

Accessories for N6700 mainframes

N6709A Rack mount kit (Opt 908) Required for rack mounting of N6700B, N6701A, N6702A. (Standard rack mount hardware will not work)

N6708A Filler panel kit (Opt FLR) Required when you have < 4 modules in an N6700B, N6701A, or N6702A. Each filler panel kit contains 3 filler panels.

Options for modules

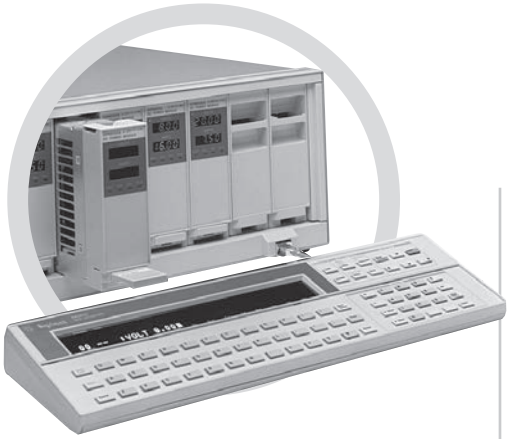
Opt 760 Open/close and polarity reverse relays (only available at time of order on models N6731B-N6736B, N6742B-N6746B, N6773A-N6776A)

Opt 761 Output disconnect relays (only available at time of order)

Opt UK6 Commercial calibration with test result data

Opt 1A7 ISO 17025 Cal Certificate

Opt 054 High-Speed Test Extension N673x, 4x, 5x, 7x. Comes standard on the N676x.



Modular Power System
1200 W per mainframe GPIB

Modular system permits up to 8 outputs of 150 W per output in 4U of rack space
Reconfigure fast with easily swappable modules
Fast, low-noise outputs
LIST mode and advance triggering system
Optional isolation and polarity reversal relays
Built-in measurements and advanced programmable features
Protection features to ensure DUT safety

66000A (mainframe)
66001A (keyboard)

66000 Modular Power System

The Agilent 66000 modular power system simplifies test-system assembly, cabling, programming, debugging and operation. It is ideal for ATE and production test environments, where it can supply bias power and stimulus to subassemblies and final products. The modular power system saves rack space, the 7-inch-high (4-EIA units) mainframe can accommodate up to eight DC power modules.

Key features

- GPIB-programmable voltage and current
- Programmable over-voltage and over-current protection
- Self-test initiated at power-up or from GPIB command
- Electronic calibration over GPIB or from keyboard
- Over-temperature protection
- Discrete fault indicator/remote inhibit (DFI/RI)
- Five nonvolatile store-recall states per output
- User-definable power-on state

Multiple Mainframes at One GPIB Address

The Agilent serial link feature will allow you to control up to 16 outputs at one GPIB address by connecting an auxiliary mainframe. The serial link cable comes standard with the

Specifications (at 0° to 55°C unless otherwise specified)		66101A	66102A	66103A	66104A	66105A	66106A
Output ratings at 40°C							
Output voltage		0 to 8 V	0 to 20 V	0 to 35 V	0 to 60 V	0 to 120 V	0 to 200 V
Output current		0 to 16 A	0 to 7.5 A	0 to 4.5 A	0 to 2.5 A	0 to 1.25 A	0 to 0.75 A
Maximum power		128 W	150 W	150 W	150 W	150 W	150 W
Programming accuracy at 25°C ±5°C							
Voltage	0.03% +	3 mV	8 mV	13 mV	27 mV	54 mV	90 mV
Current	0.03% +	6 mA	3 mA	2 mA	1.2 mA	0.6 mA	0.4 mA
Readback accuracy (via GPIB or keyboard display at 25°C ±5°C)							
Voltage	0.02%+	2 mV	5 mV	8 mV	16 mV	32 mV	54 mV
Current	0.02%+	6 mA	3 mA	2 mA	1 mA	0.6 mA	0.3 mA
Ripple and noise (20 Hz to 20 MHz)							
Constant voltage rms		2 mV	3 mV	5 mV	9 mV	18 mV	30 mV
peak-peak		5 mV	7 mV	10 mV	15 mV	25 mV	50 mV
Constant current rms		8 mA	4 mA	2 mA	1 mA	1 mA	1 mA
Line regulation							
Voltage		0.5 mV	0.5 mV	1 mV	2 mV	3 mV	5 mV
Current		0.75 mA	0.5 mA	0.3 mA	0.1 mA	50 µA	30 µA
Load regulation							
Voltage		1 mV	1 mV	1 mV	2 mV	4 mV	7 mV
Current		0.5 mA	0.2 mA	0.2 mA	0.1 mA	50 µA	30 µA
Transient response time		Less than 1 ms for the output voltage to recover within 100 mV of its previous level following any step change in load current up to 10 percent of rated current					
Supplemental Characteristics		(Non-warranted characteristics determined by design that are useful in applying the product)					
Average resolution							
Voltage		2.4 mV	5.9 mV	10.4 mV	18.0 mV	36.0 mV	60.0 mV
Current		4.6 mA	2.3 mA	1.4 mA	0.75 mA	0.39 mA	0.23 mA
Output voltage programming (OVP)		50 mV	120 mV	200 mV	375 mV	750 mV	1.25 mV
OVP accuracy		250 mV	500 mV	800 mV	1 V	1.5 V	2.5 V

More detailed specifications at **www.agilent.com/find/66000**

Modular Power System
1200 W per mainframe GPIB (Continued)

66000 MPS mainframe. For applications with a broader range of power requirements, one 66000 mainframe can be connected with up to eight of the 6640, 6650, 6670, 6680, 6690 or 6030 series of system power supplies. This solution provides power ranges from 150 watts to 5000 watts at one primary GPIB address.

Output connections

System assembly is simplified thanks to a quick-disconnect connector assembly on each module. Once your wires are connected to the load, the connector design permits the modules to be removed from the front of the mainframe without disconnecting cabling or removing the mainframe from the rack. One connector assembly is shipped with each module.

Output sequencing

Increase test throughput by using the output sequencing feature of the 66000 MPS. This powerful feature allows you to download up to 20 voltage, current, and dwell-time parameter sets per output. This sequence can be paced by the programmed dwell times. As an alternative, triggers can be used to step through the output list. The output sequences can be executed without controller intervention, thereby increasing overall test system throughput. More detailed information on the triggering and output sequencing capabilities can be obtained by ordering the 66000 Modular Power System Product Note (p/n 5091-2497E).

Specifications (at 0° to 55°C unless otherwise specified)		**66101A-J03** Special order option	**66101A-J05** Special order option	**66102A-J05** Special order option	**66103A-J01** Special order option	**66103A-J02** Special order option
Output ratings at 40°C						
Output voltage		5.7 V	12 V	15 V	37 V	40 V
Output current		20 A	12 A	10 A	4.5 A	3.6 A
Maximum power		114 W	144 W	150 W	167 W	144 W
Programming accuracy at 25°C ±5°C						
Voltage	0.03% +	2.5 mV	5 mV	8 mV	13 mV	15 mV
Current	0.03% +	8 mA	6 mA	4 mA	2 mA	2 mA
Readback accuracy (via GPIB keyboard display at 25°C ±5°C)						
Voltage	0.02% +	2 mV	3 mV	5 mV	8 mV	9.2 mV
Current	0.02% +	8 mA	6 mA	4 mA	2 mA	2 mA
Ripple and noise (20 Hz to 20 MHz)						
Constant voltage rms		2 mV	3 mV	3 mV	5.3 mV	6 mV
peak-peak		5 mV	7 mV	7 mV	10.6 mV	11.5 mV
Constant current rms		10 mA	8 mA	6 mA	2 mA	2 mA
Line regulation						
Voltage		0.5 mV	0.5 mV	0.5 mV	1 mV	1 mV
Current		0.5 mA	0.75 mA	0.5 mA	0.3 mA	0.3 mA
Load regulation						
Voltage		1 mV	1 mV	1 mV	1 mV	1 mV
Current		1 mA	0.5 mA	0.3 mA	0.2 mA	0.2 mA
Transient response time		Less than 1 ms for the output voltage to recover within 100 mV of its previous level following any step change in load current up to 10 percent of rated current				
Supplemental Characteristics		(Non-warranted characteristics determined by design that are useful in applying the product)				
Average resolution						
Voltage		2 mV	3.6 mV	4.5 mV	11 mV	12 mV
Current		6 mA	4.6 mA	3.1 mA	1.4 mA	1.2 mA
OVP		45 mV	75 mV	90 mV	200 mV	230 mV
OVP accuracy		250 mV	375 mV	375 mV	850 mV	920 mV

Application notes

66000 Modular Power System Product Note
5988-2800EN

10 Practical Tips You Need to Know About Your Power Products
5965-8239E

10 Hints for Using Your Power Supply to Decrease Test Time
5968-6359E

Agilent DC Power Supplies for Base Station Testing
5988-2386EN

More detailed specifications at **www.agilent.com/find/66000**

Modular Power System
1200 W per mainframe GPIB (Continued)

Supplemental characteristics for all model numbers

DC floating voltage: Output terminals can be floated up to ±240 VDC from chassis ground

Remote sensing: Up to half the rated output voltage can be dropped across each load lead. Add 2 mV to the voltage load regulation specification for each 1–V change in the negative output lead caused by a load current change.

Command processing time: The average time for the output voltage to change after getting an GPIB command is 20 ms.

Output programming response time (with full resistive load): The rise and fall time (10% to 90% and 90% to 10%) of the output voltage is less than 20 ms. The output voltage change settles within 0.1% of the final value in less than 120 ms.

Down programming: An active down-programmer sinks approximately 10% of the rated output current

Calibration interval: One year

AC input of system mainframe

Voltage	100 VAC	120 VAC	200 VAC	220 VAC	230 VAC	240 VAC
Max. current	29 A	25 A	16 A	16 A	15 A	15 A

Input power of system mainframe: 3200 VA (max.), 1800 W (max.), 1600 W (typ.)

GPIB capabilities: SH1, AH1, TE6, LE4, SR1, RL1, PP0, DC1, DT1, E1, and C0, and a command set compatible with IEEE-488.2 and SCPI

Software driver: VXI*Plug&Play*

Regulatory compliance: Listed to UL 1244; certified to CSA 22.2 No. 231; conforms to IEC 61010-1.

Weight: Net, 66000A, 15 kg (33 lb); 66001A, 1.05 kg (2.3 lb); 66101-66106A, 2.8 kg (6 lb). Shipping, 66000A, 19 kg (42 lb); 66001A, 1.34 kg (2.95 lb); 66101–66106A, 4.1 kg (9 lb).

Size: 66000A: 425.7 mm W x 192 mm H x 677.93 mm D (16.76 in x 7.28 in x 26.69 in), including feet and rear connectors

Warranty: One year

Specifications (at 0° to 55°C unless otherwise specified)		**66103A-J09** Special order option	**66103A-J12** Special order option	**66104A-J09** Special order option	**66105A-J01** Special order option
Output ratings at 40°C					
Output voltage		28.5 V	24 V	55 V	35 V
Output current		5.5 A	6 A	3 A	1.25 A
Maximum power		157 W	144 W	165 W	44 W
Programming accuracy at 25°C ±5°C					
Voltage	0.03% +	13 mV	13 mV	25 mV	15 mV
Current	0.03% +	3 mA	3 mA	1.5 mA	0.6 mA
Readback accuracy (via GPIB or keyboard display at 25°C ±5°C)					
Voltage	0.02% +	8 mV	8 mV	15 mV	9 mV
Current	0.02% +	3 mA	3 mA	1.2 mA	0.6 mA
Ripple and noise (20 Hz to 20 MHz)					
Constant voltage rms		5 mV	5 mV	9 mV	6 mV
peak-peak		10 mV	10 mV	15 mV	11.5 mV
Constant current rms		4 mA	4 mA	1.2 mA	1 mA
Line regulation					
Voltage		1 mV	1 mV	2 mV	1 mV
Current		0.3 mA	0.3 mA	0.1 mA	50 µA
Load regulation					
Voltage		1 mV	1 mV	2 mV	1 mV
Current		0.2 mA	0.2 mA	0.1 mA	50 µA
Transient response time		Less than 1 ms for the output voltage to recover within 100 mV of its previous level following any step change in load current up to 10 percent of rated current			
Supplemental Characteristics		(Non-warranted characteristics determined by design that are useful in applying the product)			
Average resolution					
Voltage		10.4 mV	8 mV	16.5 mV	2 mV
Current		2 mA	2 mA	0.9 mA	1.2 mA
OVP		200 mV	150 mV	350 mV	230 mV
OVP accuracy		800 mV	600 mV	950 mV	920 mV

More detailed specifications at **www.agilent.com/find/66000**

Modular Power System
1200 W per mainframe GPIB (Continued)

Ordering information

66000A MPS mainframe
* **Opt 908** Rack-mount kit (p/n 5063-9215)
* **Opt 909** Rack-mount kit with handles (p/n 5063-9222)
Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual

* **Note:** Options 908 and 909 require cabinet rails (E3663AC) or a slide kit (p/n 1494-0059) to support the loaded mainframe's weight.

A line cord option must be specified, see the AC line voltage and cord section.

66001A MPS keyboard includes 2 m (6 ft) cables
66002A Rack kit for 66001A keyboard

Module options

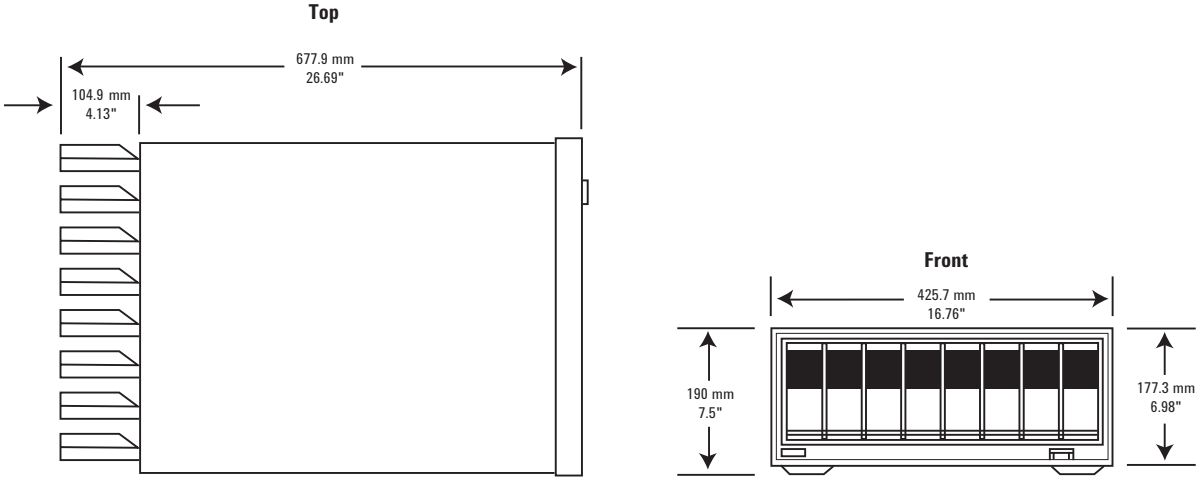
Opt 760 Open/close and polarity reversal relays
Opt J17 External Imon
Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual

Accessories

p/n 5060-3351 Field-installable relay kit
p/n 5060-3386 Standard connector assembly
p/n 5060-3387 Standard connector assembly with installed relays (Option 760)

p/n 66000-90001 Mainframe Installation Guide
p/n 5959-3360 DC Power Module User's Guide
p/n 5959-3362 DC Power Module Programming Guide
p/n 66000-90003 Mainframe Service Manual
p/n 5959-3364 DC Power Module Service Manual
p/n 1252-1488 4-Pin FLT/inhibit connector
E3663AC Support rails for Agilent rack cabinets

Agilent Models: 66000A



More detailed specifications at **www.agilent.com/find/66000**

Modular DC Power Analyzer
600 W GPIB, LAN, USB, LXI Class C

N6705B

Flexible configuration to meet your power sourcing and analysis requirements
4-slot mainframe that accepts up to 4 DC power modules
600 W total DC power module output power
The modules are ordered separately

New instrument category

The Agilent N6705 DC Power Analyzer represents an entirely new instrument category for R&D engineers. It provides unrivaled productivity gains when sourcing and measuring DC voltage and current into a DUT. Using the Agilent N6705 DC Power Analyzer, R&D engineers can gain insights into the DUT's power consumption in minutes without writing a single line of code. It provides an easy-to-use interface, with all sourcing and measuring functions available from the front panel. When automated bench setups are required, the N6705B is fully programmable over GPIB, USB, LAN and is LXI Class C Compliant.

Modular System Based on DC Power Supply Outputs

The Agilent N6705B DC power analyzer is a modular system that is tailorable to meet specific test needs. At the heart of the DC power analyzer is the DC power module. The Agilent N6705B DC power analyzer is a mainframe that has four slots to accept one to four DC power modules. Each DC power module takes one slot, except for the N6753A, N6754A 300 W and N6755A, N6756A 500 W high performance autoranging DC power modules, and the N6763A, N6764A, 300 W and N6765A, N6766A 500 W precision autoranging DC power modules, which occupy two slots. The N6705B accepts the same modules as N6700 Low-Profile Modular Power System. Select from more than 30 different DC power modules ranging in capability from basic to high precision, and in power from 50 W to 500 W. This modular design gives you the flexibility to mix and match over twenty different DC power modules to create a solution optimized to meet specific test requirements.

Specifications (at 0° to 55°C unless otherwise specified)	**N6730B**	**N6740B**	**N6770A**	**N6751A N6752A**	**N6753A N6755A** Note	**N6754A N6756A**
Output ratings*						
Voltage	6 models 5 V to 100 V	6 models 5 V to 100 V	5 models 20 V to 150 V	50 V	20 V	60 V
Current	6 models 0.5 A to 10 A	6 models 1 A to 20 A	5 models 2 A to 15 A	5 A 10 A	50 A	20 A 17 A
Power	50 W	100 W	300 W	50 W 100 W	300 W 500 W	300 W 500 W
Autoranging	No	No	No	Yes	Yes	Yes
Measurement accuracy*						
Voltage	0.1% + 20 mV to 100 mV	0.1% + 20 mV to 100 mV	0.1% + 20 mV to 150 mV	0.05% + 20 mV	0.05% + 10 mV	0.06% + 25 mV
Current	0.15% + 2 mA to 20 mA	0.15% + 2 mA to 20 mA	0.15% + 6 mA to 15 mA	0.1% + 4 mA	0.1% + 30 mA	0.1% + 8 mA
Noise (20 Hz to 20 MHz)*	10 mVpp to 30 mVpp	11 mVpp to 30 mVpp	20 mVpp to 68 mVpp	0.35 mVrms 4.5 mVpp	1 mVrms 5 mVpp	1 mVrms 6 mVpp
Polarity reverse relays	Optional	Optional	Optional	Not available	Optional	Optional
Output relays	Optional	Optional	Optional	Optional	Optional	Optional

***Key Specifications** (Range of values for families of modules – see data sheet for specifics)
Scope: Up to 100 kHz digitizer for N673x, N674x, N675x, N676x, and N677x modules
ARB: Approx max bandwidth = 5 kHz for N675x and N676x modules; 500 Hz for N673x, 4x, and 7x modules
Note: Requires special installation. Instructions ship with the module.

More detailed specifications at **www.agilent.com/find/N6705B**

Modular DC Power Analyzer
600 W GPIB, LAN, USB, LXI Class C (Continued)

The Agilent N6705 DC power analyzer saves time

- Provides unrivaled productivity gains for sourcing and measuring DC voltage and current into your DUT by integrating up to four advanced power supplies with DMM, scope, arb, and data logger features.
- Eliminates the need to gather multiple pieces of equipment, create complex test setups including transducers (such as current probes and shunts) to measure current into your DUT.
- Eliminates the need to develop and debug programs to control a collection of instruments and take useful measurements because all the functions and measurements are available at the front panel.

Agilent N6705 DC power analyzer makes these tasks easy, right from the front panel

- Setup and view critical turn-on/ turn-off sequences
- Measure and display voltage, current versus time to visualize power into the DUT
- Control DC bias supply ramp-up/ down rates
- Generate DC bias supply transients and disturbances
- Log data for seconds, minutes, hours, or even days to see current consumption or capture anomalies
- Save data and screen shots to internal storage or external USB memory devices
- Save and name your setup and tests for easy re-use
- Share setups with colleagues

Specifications (at 0° to 55°C unless otherwise specified)	**N6761A N6762A**	**N6763A N6765A** Note	**N6764A N6766A**
Output ratings			
Voltage	50 V	20 V	60 V
Current	1.5 A 3 A	50 A	20 A 17 A
Power	50 W 100 W	300 W 500 W	300 W 500 W
Autoranging	Yes	Yes	Yes
Measurement accuracy			
Voltage	0.016% + 6 mV	0.03% + 10 mV	0.03% + 25 mV
Current	0.04% + 160 µA**	0.1% + 10 mA	0.1% + 5 mA
Noise (20 Hz to 20 MHz)	0.35 mVrms 4.5 mVpp	1 mVrms 5 mVpp	1 mVrms 6 mVpp
Polarity reverse relays	Not available	Not available	Not available
Output relays	Optional	Optional	Optional

**0.5% + 100 nA with Option 2UA

Scope: Up to 100 kHz digitizer for N673x, N674x, N675x, N676x, and N677x modules

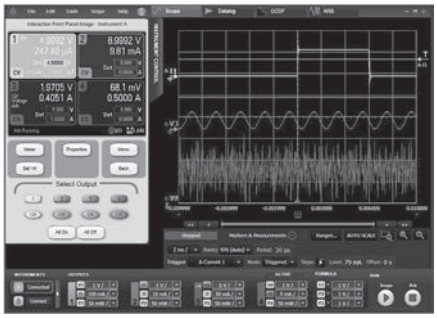
ARB: Approx max bandwidth = 5 kHz for N675x and N676x modules; 500 Hz for N673x, 4x, and 7x modules

Note: Requires special installation. Instructions ship with the module.

New 14585A control and analysis software saves even more time

The new 14585A Control and Analysis Software is a companion PC application that gives you control of up to four N6705 mainframes from a single PC control screen. With this software, you get improved data visualization and data management.

Visit **www.agilent.com/find/14585** for more information.



More detailed specifications at **www.agilent.com/find/N6705B**

Modular DC Power Analyzer
600 W GPIB, LAN, USB, LXI Class C (Continued)

Ordering information

Mainframe

N6705B DC power analyzer mainframe Holds 1 to 4 modules. Total available output power = 600 W.

The N6705B mainframe and various modules can be ordered as separate products such that you can configure the system as needed.

N6715B build-to-order DC power analyzer system consists of 1 N6705B mainframe with total available power of 600 W.

The N6715B system is a build-to-order DC power analyzer system that is shipped as a fully assembled multiple-output power supply. Modules are ordered as options to the mainframe.

N6705U Upgrade Model
For more information, see **www.agilent.com/find/N6705U**

Options for N6705B/15B mainframes

Opt 908 Rack mount kit

Opt AKY Delete front/rear USB. This option removes all USB capability from the DC power analyzer. Both the front panel USB port and the rear panel USB port are removed.

Opt 055 Delete Data logger This option disables the data logger functionality in the DC power analyzer firmware. The DC power analyzer hardware is unchanged. To enable the data logger functionality at a later time, order the N6705U upgrade kit.

Opt 056 Add 14585A Software License

Opt ABA Full documentation on CD-ROM and printed Users Guide

Opt 0B0 Full documentation on CD-ROM only; no printed documentation package

Opt 900 Power Cord, United Kingdom

Opt 901 Power Cord, Australia, New Zealand

Opt 902 Power Cord, Europe, Korea

Opt 903 Power Cord, USA, Canada, 120 V

Opt 904 Power Cord, USA, Canada, 240 V

Opt 906 Power Cord, Switzerland

Opt 912 Power Cord, Denmark

Opt 917 Power Cord, South Africa, India

Opt 918 Power Cord, Japan, 100 V

Opt 919 Power Cord, Israel

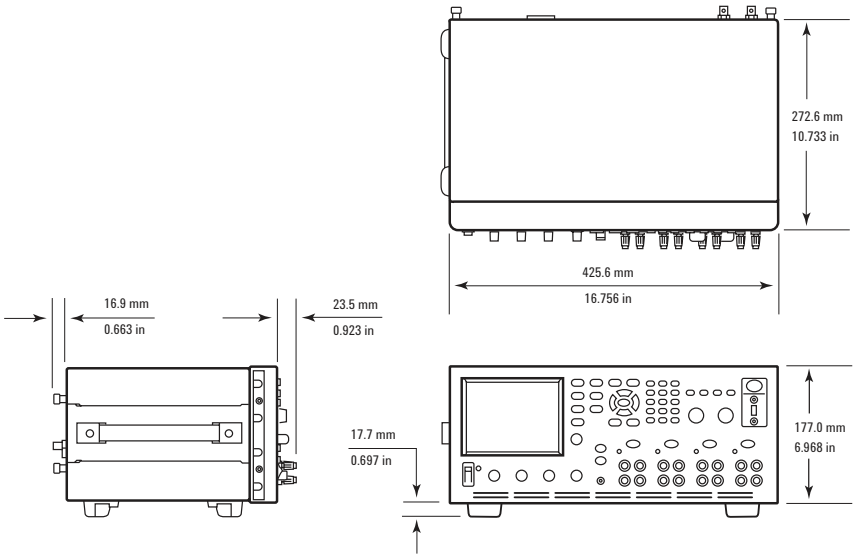
Opt 920 Power Cord, Argentina

Opt 921 Power Cord, Chile

Opt 922 Power Cord, China

Opt 927 Power Cord, Thailand, Brazil

Agilent Models: N6705B, N6715B



More detailed specifications at **www.agilent.com/find/N6705B**

DC Electronic Loads...

maximize thoughput with real life loading conditions

Agilent DC electronic loads provide solutions for the problems of testing DC power sources.

Multiple Input Electronic Loads

The Agilent N3300A series of DC electronic loads has been optimized for the needs of high volume manufacturing test. Test throughput is maximized with both faster speed and specialized programming and measurement capabilities. The accuracy is enhanced over previous Agilent electronic loads, to meet the needs of testing today's smaller power supplies.

Single Input Electronic Loads

The 6060B and 6063B are single input DC electronic loads. They are convenient for testing of one single output DC power supply. They provide a total solution, with built-in measurement functions. However, to maximize either speed or accuracy, the N3300A series electronic loads are recommended.

Multiple-Input
150 W to 600 W

Standard DC connectors

Option UJ1 8 mm screw connectors

N3300A-N3307A

- Decrease system development time
- Increase system reliability
- Increase system flexibility
- DC connection terminal for ATE applications
- Lower cost of ownership
- Increase test system throughput
- Stable operation down to zero volts

Increase Test Throughput

Today's high volume manufacturing requires optimization of test system throughput, to maximize production volume without increasing floor-space. The N3300A series electronic loads can help you in a number of ways to achieve this goal.

Reduced command processing time
Commands are processed more than 10 times faster than previous electronic loads.

Automatically execute stored command sequences
"Lists" of downloaded command sequences can execute independent of the computer, greatly reducing the electronic load command processing time and computer interaction time during product testing.

Programmable delay allows for either simultaneous or sequential load changes
This is the most efficient way to conduct testing of multiple output DC power supplies, simulating real-life loading patterns, with a minimum of programming commands.

Buffer measurement data
Voltage, current, and power measurements can be buffered for later readback to the computer, reducing computer interaction.

Control measurement speed vs. accuracy
Decrease the number of measurement samples to achieve greater measurement speed, or increase the number of samples to achieve higher measurement accuracy. You can optimize your measurements for each test.

Control rising and falling slew rates separately
Reduce rate of loading change when necessary for DUT stability or to simulate real life conditions, but otherwise change load values at maximum rate.

Increase System Flexibility... for Both Present and Future Requirements

Most power supply and battery charger test systems designed today need to test a variety of products and/or assemblies. In the future, additional products or assemblies may be needed. A flexible family of electronic loads makes present system design and future growth much easier.

Test low voltage power supplies
The N3300A series electronic loads operate with full stability down to zero volts. Many other electronic loads available today have been found to become unstable in the operating region below one volt. When designing power supply test platforms, the trend towards lower voltage requirements should be taken into account. Refer to the specification and supplemental characteristic tables for details of lower voltage operating characteristics.

Choose DC load connection method
Automatic test systems need consistency and reliability. Option UJ1 8 mm screw connectors provide a simple screw onto which your wires, terminated with insulated ring terminals, may be securely mounted. This optional connector is specifically designed for test systems. Wires may exit the plastic cover in any direction, and multiple wires may be placed on each screw terminal for easy parallel load connections. Up to AWG 4 wire may be used.

Applications which require repeated connections/disconections are better suited to the standard connector. The standard connector accepts an unterminated wire, and may be hand-tightened. This connector is specifically designed for bench applications and short-term automated tests.

More detailed specifications at **www.agilent.com/find/N3300**

Multiple-Input: 150 W to 600 W (Continued)

Design a system to test a variety of products
This series consists of 2 mainframes and 5 modules. The N3300A mainframe is full rack width. It has 6 slots. The N3301A mainframe is half rack width. It has 2 slots. Any assortment of the 5 different modules can be configured into these mainframes, up to the slot capacity. The N3302A (150 watts), N3303A (250 watts), N3307A (250 watts) and N3304A (300 watts) each require one slot. The N3305A (500 watts) and the N3306A (600 watts) each require 2 slots. The electronic load can be configured to supply exactly what you need now, and this modular design also allows for easy future reconfiguration.

Test high current power supplies
Electronic load modules can be operated in parallel to provide addition current sinking capability.

Control the electronic load how you want to
GPIB, RS232, and manual use of the front panel all provide complete control of these electronic loads. There are also analog programming and monitoring ports for those applications that utilize non-standard interfaces, require custom waveforms, or utilize process control signals. Custom waveforms can also be created by downloading a "List" of load parameters. In addition, there is a built-in transient generator, which operates in all modes.

Quickly create powerful and consistent software
All Agilent Technologies electronic loads use the SCPI (Standard Commands for Programmable Instruments) command set. This makes learning the commands easy, because they are the same format as all other SCPI instruments. The resulting code is virtually self-documenting, and therefore easier to troubleshoot and modify in the future. *Plug-n-Play* drivers are also available to help you to integrate the loads into your standard software packages.

Make Measurements Easily and Accurately

The 16-bit voltage, current and power measurement system provides both accuracy and convenience. The alternative is using a dmm (digital multimeter) and MUX (multiplexer) along with a precision current shunt and a lot of extra wiring. Avoiding this complexity increases system reliability and makes the system easier to design and support. Current measurements in particular are more consistently accurate using the electronic load's internal system, because the wiring associated with an external precision current shunt may pick up noise.

Measure with all load modules simultaneously
Testing multiple-output DC power supplies and DC-DC converters can be very time consuming if each output must be tested sequentially. If measurements are being made through a MUX using one DMM, this is what will happen. Using the built-in measurement capabilities of the N3300A electronic loads, all outputs can be measured simultaneously. Alternatively, multiple single output power sources can be tested simultaneously.

Measure voltage and current simultaneously
The N3300A measurement system has individual but linked current and voltage measurement systems. This means that voltage and current measurements are taken exactly simultaneously, which gives a true picture of the power supply under test's output at a particular moment in time. Some other electronic loads which feature internal measurement systems actually take current and voltage measurements sequentially, and therefore do not give as accurate a picture of momentary power.

Observe transient behavior using waveform digitization
Transient response and other dynamic tests often require an oscilloscope. The N3300A has a flexible waveform digitizer with a 4096 data point buffer for voltage and a 4096 data point buffer for current. Under many circumstances, this internal digitizer will be adequate for power supply test needs. Current and voltage are digitized simultaneously, and the sampling rate and sample window are programmable. Some analysis functions are provided, including RMS, max and min.

More detailed specifications at **www.agilent.com/find/N3300**

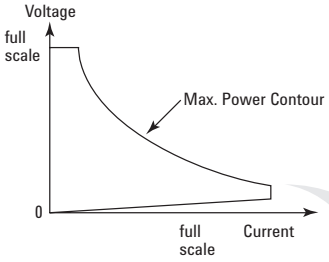
Multiple-Input: 150 W to 600 W (Continued)

Table A-1 Specifications

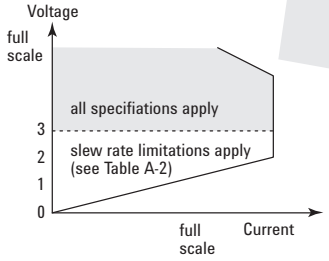
Table A-1 lists the specifications for the different load models. Specifications indicate warranted performance in the 25°C ±5°C region of the operating temperature range. Specifications apply to normal and transient modes unless otherwise noted.

Input characteristic

Operating contour



Derated current detail



Notes

1 Maximum continuous power available is derated linearly from 100% of maximum at 40°C, to 75% of maximum at 55°C.

2 Specification is ± (% of reading + fixed offset). Measurement is 1000 samples. Specification may degrade when the unit is subject to an RF field of 3 V/meter, the unit is subject to line spikes of 500 V, or an 8 kV electrostatic discharge.

3 DC current accuracy specifications apply 30 seconds after input current is applied.

	N3302A	N3303A	N3304A	N3305A	N3306A	N3307A
Input ratings						
Current	0 - 30 A	0 - 10 A	0 - 60 A	0 - 60 A	0 - 120 A	0 - 30 A
Voltage	0 - 60 V	0 - 240 V	0 - 60 V	0 - 150 V	0 - 60 V	0 - 150 V
Maximum power @ 40°C[1]	150 W	250 W	300 W	500 W	600 W	250 W
Specified current @ low voltage operation						
2.0 V	30 A	10 A	60 A	60 A	120 A	30 A
1.5 V	22.5 A	7.5 A	45 A	45 A	90 A	22.5 A
1.0 V	15 A	5 A	30 A	30 A	60 A	15 A
0.5 V	7.5 A	2.5 A	15 A	15 A	30 A	7.5 A
0 V	0 A	0 A	0 A	0 A	0 A	0 A
Typical minimum operating voltage @ full scale current	Table A-1 states that maximum current is available down to 2 volts. Typically, however under normal operating conditions, the load can sink the maximum current down to the following voltages:					
	1.2 V	1.2 V	1.2 V	1.4 V	1.4 V	1.4 V
Constant current mode[2]						
Low range/high range	3 A/30 A	1 A/10 A	6 A/60 A	6 A/60 A	12 A/120 A	3 A/30 A
Regulation	10 mA	8 mA	10 mA	10 mA	10 mA	10 mA
Low range accuracy 0.1% +	5 mA	4 mA	7.5 mA	7.5 mA	15 mA	7.5 mA
High range accuracy 0.1% +	10 mA	7.5 mA	15 mA	15 mA	37.5 mA	15 mA
Constant voltage mode[2]						
Low range/high range	6 V/60 V	24 V/240 V	6 V/60 V	15 V/150 V	6 V/60 V	15 V/150 V
Regulation	5 mV	10 mV	10 mV	10 mV	20 mV	10 mV
Low range accuracy 0.1% +	3 mV	10 mV	3 mV	10 mV	3 mV	10 mV
High range accuracy 0.1% +	8 mV	40 mV	8 mV	20 mV	8 mV	20 mV
Constant resistance mode[2]						
Range 1 (I >10% of current rating)	0.067-4 Ω	0.2-48 Ω	0.033-2 Ω	0.033-5 Ω	0.017-1 Ω	0.067-10 Ω
Range 2 (I >1% of current rating)	3.6-40 Ω	44-480 Ω	1.8-20 Ω	4.5-50 Ω	0.9-10 Ω	9-100 Ω
Range 3 (I >0.1% of current rating)	36-400 Ω	440-4800 Ω	18-200 Ω	45-500 Ω	9-100 Ω	90-1000 Ω
Range 4 (I >0.01% of current rating)	360-2000 Ω	4400-12000 Ω	180-2000 Ω	450-2500 Ω	90-1000 Ω	900-2500 Ω
Transient generator						
Frequency range	0.25 Hz-10 kHz	0.25 Hz-10 kHz	0.25 Hz-10 kHz	0.25 Hz-10 kHz	0.25 Hz 10 kHz	0.25 Hz-10 kHz
Pulse width	50 µs ±1% to 4 seconds ±1%	50 µs ±1% to 4 seconds ±1%	50 µs ±1% to 4 seconds ±1%	50 µs ±1% to 4 seconds ±1%	50 µs ±1% to 4 seconds ±1%	50 µs ±1% to 4 seconds ±1%
Current measurement[2]						
Low range/high range	3 A/30 A	1 A/10 A	6 A/60 A	6 A/60 A	12 A/120 A	3 A/30 A
Low range accuracy[3] 0.05% +	3 mA	2.5 mA	5 mA	5 mA	10 mA	3 mA
High range accuracy[3] 0.05% +	6 mA	5 mA	10 mA	10 mA	20 mA	6 mA
Voltage measurement[2]						
Low range/high range	6 V/60 V	24 V/240 V	6 V/60 V	15 V/150 V	6 V/60 V	15 V/150 V
Low range accuracy 0.05% +	3 mV	10 mV	3 mV	8 mV	3 mV	8 mV
High range accuracy 0.05% +	8 mV	20 mV	8 mV	16 mV	8 mV	16 mV
Power measurement[2]						
Accuracy 0.1% +	0.5 W	1.2 W	0.5 W	1.5 W	1.2 W	0.5 W

More detailed specifications at **www.agilent.com/find/N3300**

Multiple-Input: 150 W to 600 W (Continued)

Table A-2 Supplemental Characteristics

Table A-2 lists the supplemental characteristics, which are not warranted but are descriptions of typical performance determined either by design or type testing.

Notes

[1] Slew rate bands are the ranges of programmable slew rates available. When you program a slew rate value outside the indicated bands, the electronic load will automatically adjust the slew rate to fit within the band that is closest to the programmed value. It is not necessary to specify the band, only the slew rate itself.

Below 3 volts, the maximum bandwidth of the electronic load is reduced by a factor of ten to one. For example, in the current range for Model N3302A, the maximum slew rate is specified as 2.5 MA/s, below 3 volts the maximum slew rate would be 250 kA/s. Any slew rate programmed between 2.5 MA/s and 250 kA/s would produce a slew rate of 250 k/s. Slew rates programmed slower than 250 kA/s would still correctly reflect their programmed value. Note that if you are using transient mode to generate a high frequency pulse train, a reduced slew rate might cause the load to never reach the upper programmed value before beginning the transition to the lower programmed value. So even though the transient mode is still operational at lower voltages, a fast pulse train with large transitions may not be achievable.

		N3302A	N3303A	N3304A	N3305A	N3306A	N3307A
Programming resolution							
Constant current mode		0.05 mA/ 0.5 mA	0.02 mA/ 0.2 mA	0.1 mA/ 1 mA	0.1 mA/ 1 mA	0.2 mA/ 2 mA	0.05 mA/ 0.5 mA
Constant voltage mode		0.1 mV/1 mV	0.4 mV/4 mV	0.1 mV/1 mV	0.25 mV/2.5 mV	0.1 mV/1 mV	0.25 mV/2.5 mV
Constant resistance mode		0.07/0.7/ 7/70 mΩ	0.82/8.2/ 82 mΩ	0.035/0.35/ 3.5/35 mΩ	0.085/0.85/ 8.5/85 mΩ	0.0175/0.175/ 1.75/17.5 mΩ	0.17/1.7/ 17/170 mΩ
Readback resolution							
Current		0.05 mA/ 0.5 mA	0.02 mA/ 0.2 mA	0.1 mA/ 1 mA	0.1 mA/ 1 mA	0.2 mA/ 2 mA	0.05 mA/ 0.5 mA
Voltage		0.1 mV/ 1 mV	0.4 mV/ 4 mV	0.1 mV/ 1 mV	0.25 mV/ 2.5 mV	0.1 mV/ 1 mV	0.25 mV/ 2.5 mV
Programmable slew rate[1]							
Current ranges	Slow band	500 A/s - 25 kA/s	167 A/s - 8330 A/s	1 kA/s - 50 kA/s	1 kA/s - 50 kA/s	2 kA/s - 100 kA/s	500 A/s - 25 kA/s
	Fast band ≥3 V	50 kA/s - 2.5 MA/s	16.7 kA/s - 833 kA/s	100 kA/s - 5 MA/s	100 kA/s - 5 MA/s	200 kA/s - 10 MA/s	50 kA/s - 2.5 MA/s
	Fast band <3 V	50 kA/s - 250 kA/s	16.7 kA/s - 83.3 kA/s	100 kA/s - 500 kA/s	100 kA/s - 500 kA/s	200 kA/s - 1 MA/s	50 kA/s - 250 kA/s
Voltage ranges	Slow band	1 kV/s - 50 kV/s	4 kV/s - 200 kV/s	1 kV/s - 50 kV/s	2.5 kV/s - 125 kV/s	1 kV/s - 50 kV/s	2.5 kV/s - 125 kV/s
	Fast band ≥3 V	100 kV/s - 500 kV/s	400 kV/s - 2 MV/s	100 kV/s - 500 kV/s	250 kV/s - 1.25 MV/s	100 kV/s - 500 kV/s	250 kV/s - 1.25 MV/s
	Fast band <3 V	100 kV/s - 50 kV/s	400 kV/s - 200 kV/s	100 kV/s - 50 kV/s	250 kV/s - 125 kV/s	100 kV/s - 50 kV/s	250 kV/s - 125 kV/s
Resistance range 1	Slow band	44 Ω/s - 1125 Ω/s	540 Ω/s - 13.5 kΩ/s	22 Ω/s - 560 Ω/s	55 Ω/s - 1400 Ω/s	11 Ω/s - 280 Ω/s	110 Ω/s - 2800 Ω/s
	Fast band ≥3 V	2250 Ω/s - 34 kΩ/s	27 kΩ/s - 408 kΩ/s	1120 Ω/s - 17 kΩ/s	2800 Ω/s - 42.5 kΩ/s	560 Ω/s - 8.5 kΩ/s	5600 Ω/s - 85 kΩ/s
	Fast band <3 V	2250 Ω/s - 3.4 kΩ/s	27 kΩ/s - 40.8 kΩ/s	1120 Ω/s - 1.7 kΩ/s	2800 Ω/s - 4.25 kΩ/s	560 Ω/s - 850 Ω/s	5600 Ω/s - 8.5 kΩ/s
Resistance range 2	Slow band	440 Ω/s - 11.25 kΩ/s	5.4 kΩ/s - 135 kΩ/s	220 Ω/s - 5600 Ω/s	550 Ω/s - 14 kΩ/s	110 Ω/s - 2800 Ω/s	1.1 kΩ/s - 28 kΩ/s
	Fast band ≥3 V	22.5 kΩ/s - 340 kΩ/s	270 kΩ/s - 4.08 MΩ/s	11.2 kΩ/s - 170 kΩ/s	28 kΩ/s - 425 kΩ/s	5600 Ω/s - 85 kΩ/s	56 kΩ/s - 850 kΩ/s
	Fast band <3 V	22.5 kΩ/s - 34 kΩ/s	270 kΩ/s - 408 kΩ/s	11.2 kΩ/s - 17 kΩ/s	28 kΩ/s - 42.5 kΩ/s	5600 Ω/s - 8.5 kΩ/s	56 kΩ/s - 85 kΩ/s
Resistance range 3	Slow band	4.4 kΩ/s - 112.5 kΩ/s	54 kΩ/s - 1.35 MΩ/s	2.2 kΩ/s - 56 kΩ/s	5.5 kΩ/s - 140 kΩ/s	1.1 kΩ/s - 28 kΩ/s	11 kΩ/s - 280 kΩ/s
	Fast band ≥3 V	225 kΩ/s - 3.4 MΩ/s	2.7 MΩ/s - 40.8 MΩ/s	112 kΩ/s - 1.7 MΩ/s	280 kΩ/s - 4.25 MΩ/s	56 kΩ/s - 850 kΩ/s	560 kΩ/s - 8.5 MΩ/s
	Fast band <3 V	225 kΩ/s - 340 kΩ/s	2.7 MΩ/s - 4.08 MΩ/s	112 kΩ/s - 170 kΩ/s	280 kΩ/s - 425 kΩ/s	56 kΩ/s - 85 kΩ/s	560 kΩ/s - 850 kΩ/s
Resistance range 4	Slow band	44 kΩ/s - 1.125 MΩ/s	540 kΩ/s - 13.5 MΩ/s	22 kΩ/s - 560 kΩ/s	55 kΩ/s - 1.4 MΩ/s	11 kΩ/s - 280 kΩ/s	110 kΩ/s - 2.8 MΩ/s
	Fast band ≥3 V	2.25 MΩ/s - 34 MΩ/s	27 MΩ/s - 408 MΩ/s	1.12 MΩ/s - 17 MΩ/s	2.8 MΩ/s - 42.5 MΩ/s	560 kΩ/s - 8.5 MΩ/s	5.6 MΩ/s - 85 MΩ/s
	Fast band <3 V	2.25 MΩ/s - 3.4 MΩ/s	27 MΩ/s - 40.8 MΩ/s	1.12 MΩ/s - 1.7 MΩ/s	2.8 MΩ/s - 4.25 MΩ/s	560 kΩ/s - 850 kΩ/s	5.6 MΩ/s - 8.5 MΩ/s

Multiple-Input: 150 W to 600 W (Continued)

Table A-2 (Continued) Supplemental Characteristics

Table A-2 lists the supplemental characteristics, which are not warranted but are descriptions of typical performance determined either by design or type testing.

Notes

[2] Applies to all ranges.

	N3302A	N3303A	N3304A	N3305A	N3306A	N3307A
Programmable short	66 mΩ max.	200 mΩ max.	33 mΩ max.	33 mΩ max.	17 mΩ max.	33 mΩ max.
	40 mΩ typical	100 mΩ typical	20 mΩ typical	25 mΩ typical	12 mΩ typical	20 mΩ typical
Programmable open	≥20 kΩ	≥80 kΩ	≥20 kΩ	≥20 kΩ	≥20 kΩ	≥80 kΩ
Command processing time						
Using discrete commands	3 ms	3 ms	3 ms	3 ms	3 ms	3 ms
Using list commands	1 ms	1 ms	1 ms	1 ms	1 ms	1 ms
List dwell characteristics						
Range	0 - 10 s	0 - 10 s	0 - 10 s	0 - 10 s	0 - 10 s	0 - 10 s
Resolution	1 ms	1 ms	1 ms	1 ms	1 ms	1 ms
Accuracy	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms
Measurement time						
1000 samples (default)	20 ms (with specified measurement accuracy)	20 ms (with specified measurement accuracy)	20 ms (with specified measurement accuracy)	20 ms (with specified measurement accuracy)	20 ms (with specified measurement accuracy)	20 ms (with specified measurement accuracy)
200 samples	10 ms (with <6% additional fixed offset)	10 ms (with <6% additional fixed offset)	10 ms (with <6% additional fixed offset)	10 ms (with <6% additional fixed offset)	10 ms (with <6% additional fixed offset)	10 ms (with <6% additional fixed offset)
100 samples	9 ms (with <10% additional fixed offset)	9 ms (with <10% additional fixed offset)	9 ms (with <10% additional fixed offset)	9 ms (with <10% additional fixed offset)	9 ms (with <10% additional fixed offset)	9 ms (with <10% additional fixed offset)
20 points	7 ms (with <30% additional fixed offset)	7 ms (with <30% additional fixed offset)	7 ms (with <30% additional fixed offset)	7 ms (with <30% additional fixed offset)	7 ms (with <30% additional fixed offset)	7 ms (with <30% additional fixed offset)
<20 points	7 ms (with >30% additional fixed offset)	7 ms (with >30% additional fixed offset)	7 ms (with >30% additional fixed offset)	7 ms (with >30% additional fixed offset)	7 ms (with >30% additional fixed offset)	7 ms (with >30% additional fixed offset)
Ripple and noise (20 Hz - 10 MHz)						
Current (rms/peak to peak)	2 mA/20 mA	1 mA/10 mA	4 mA/40 mA	4 mA/40 mA	6 mA/60 mA	2 mA/20 mA
Voltage (rms)	5 mV_{rms}	12 mV_{rms}	6 mV_{rms}	10 mV_{rms}	8 mV_{rms}	10 mV_{rms}
External analog programming						
Voltage programming accuracy[2]	0.5% + 12 mV	0.5% + 48 mV	0.5% + 12 mV	0.5% + 30 mV	0.5% + 12 mV	0.5% + 30 mV
Current programming accuracy[2]	0.25% + 4.5 mA	0.25% + 1.5 mA	0.25% + 9 mA	0.25% + 9 mA	0.25% + 18 mA	0.25% + 4.5 mA
External monitor ports						
Voltage monitor accuracy	0.25% + 12 mV	0.25% + 48 mV	0.25% + 12 mV	0.25% + 30 mV	0.25% + 12 mV	0.25% + 30 mV
Current monitor accuracy	0.1% + 4.5 mA	0.1% + 1.5 mA	0.1% + 9 mA	0.1% + 9 mA	0.1% + 18 mA	0.1% + 4.5 mA

Multiple-Input: 150 W to 600 W (Continued)

Table A-3 Supplemental Characteristics

	N3300A	N3301A
Operating temperature range	0°C to 55°C	0°C to 55°C
Input ratings		
Operating range	100 - 250 VAC 48 - 63 Hz	100 - 250 VAC 48 - 63 Hz
Input current	4.2 A @ 100 - 127 VAC 2.2 A @ 200 - 250 VAC	2.3 A @ 100 - 250 VAC
Input VA	440 VA	230 VA
Inrush current	38 A	18 A @ 115 VAC 36 A @ 230 VAC

Application notes

Agilent AN 372-1 Power Supply Testing
(AN 372-1)
5952-4190

Agilent AN 372-2 Battery Testing
(AN 372-2)
5952-4191

Increasing DC Power Supply Test System Throughput with Agilent Technologies N3300A DC Electronic Loads
5980-0233E

Agilent Zero Volt Electronic Load
5968-6360E

Making Fuel Cell AC Impedance Measurements Utilizing Agilent N3300A Series Electronic Loads
5988-5358EN

Supplemental characteristics for all model numbers

Analog programming bandwidth:
10 kHz (-3 db frequency) in CC mode only

Analog programming voltage:
Voltage: 0 - 10 V
Current: 0 - 10 V

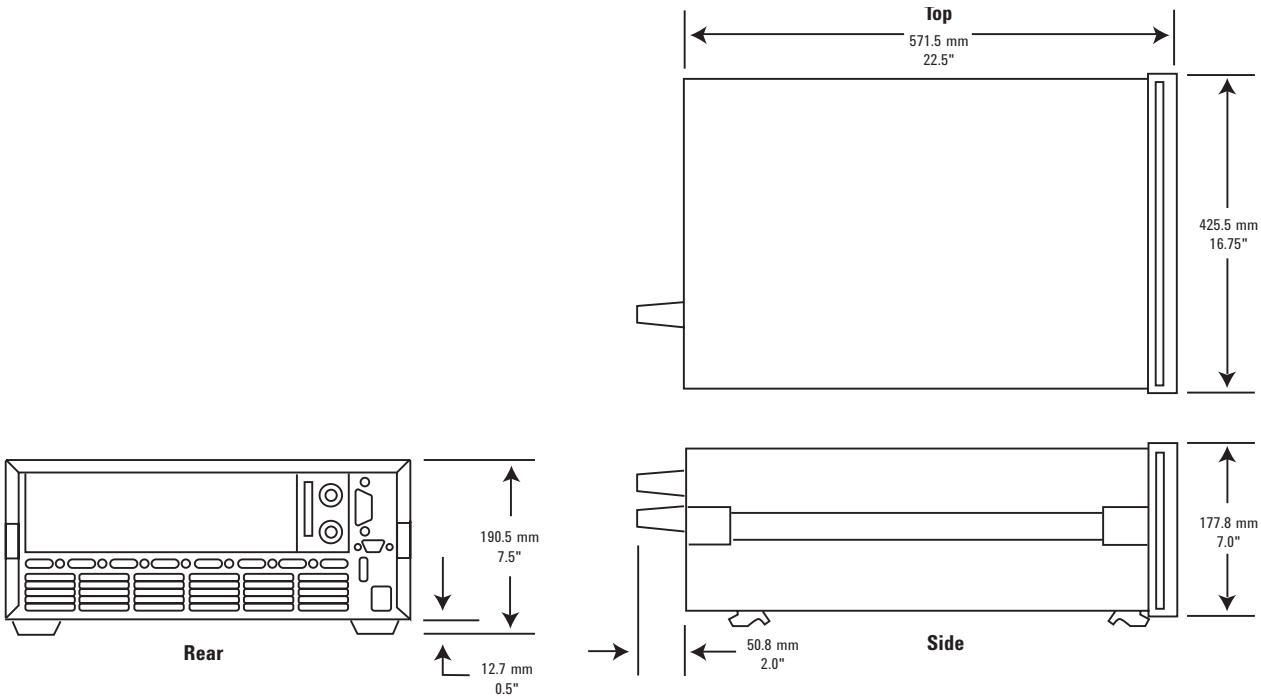
Analog monitor ports:
Voltage: 0 - 10 V
Current: 0 - 10 V

Remote sensing:
5 VDC between sense and load input

Digital/trigger inputs:
V_{il} = 0.9 V max at I_{il} = -1 mA
V_{ih} - 3.15 V min
(pull-up resistor on input)

Digital/trigger outputs:
V_{ol} = 0.72 V max at I_{ol} = 1 mA
V_{oh} = 4.4 V min at I_{oh} = -20 µA

Agilent Models: N3300A



More detailed specifications at **www.agilent.com/find/N3300**

Multiple-Input: 150 W to 600 W (Continued)

Software driver:
VXI*Plug&Play*

Net weight:
N3300A: 13.2 kg (29 lb); N3301A: 7.3 kg (16 lb); N3302A, N3303A or N3304A: 2.7 kg (6 lb); N3305A or N3306A: 4.6 kg (10 lb), N3307A 2.7 kg (6 lb)

Shipping weight:
N3300A: 17 kg (38 lb); N3301A: 9.1 kg (20 lb) N3302A, N3303A, or N3304A: 4.1 kg (9 lb) N3305A or N3306A: 6.8 kg (15 lb), N3307A 4.1 kg (9 lb)

Warranty: One year

Ordering information

Opt. UJG: Standard finger twist connector

Opt. UJ1: 8 mm screw terminal connector (available on all load modules N3302A-N3307A)

Opt. 800: Rack-mount kit for two N3301A mainframes mounted side-by-side (p/n 5061-9694 and 5062-3978).

Opt. 908: Rack-mount kit (two p/n 5062-3974C for a N3300A, or p/n 5062-3960 for one N3301A). For the N3301A, the kit includes a blank filler panel.

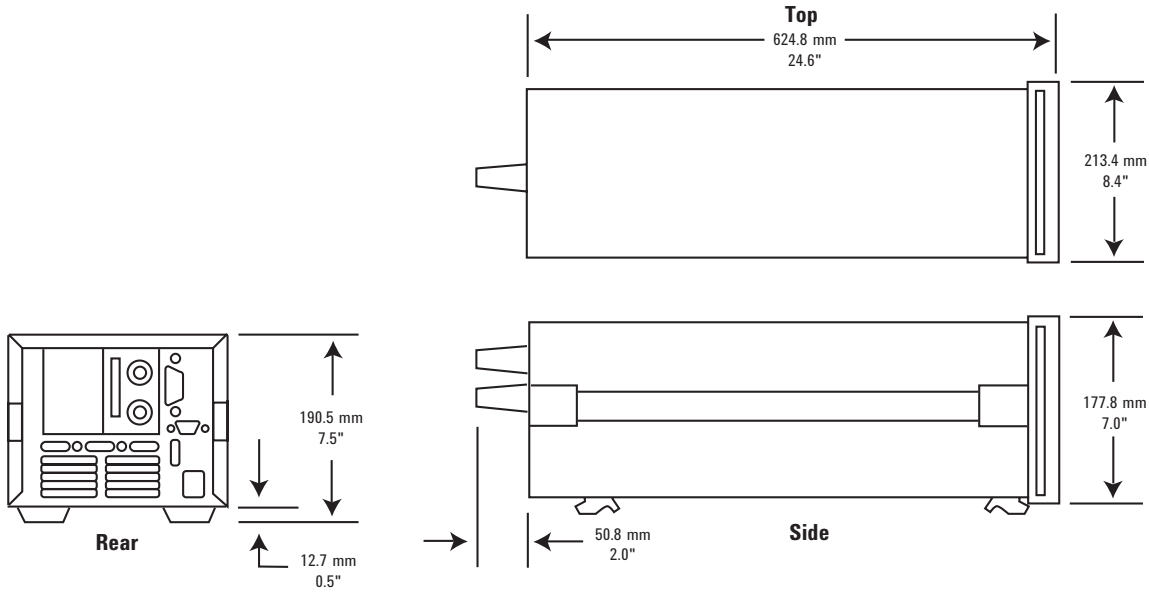
Opt. 909: Rack-mount kit with handles for N3300A (two p/n 5062-3975 and 5063-9219)

Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package

Opt 0L2 Extra copy of standard printed documentation package

Opt 0B0 Full documentation on CD-ROM only

Agilent Models: N3301A



More detailed specifications at **www.agilent.com/find/N3300**

Single-Input
250 W to 300

6060B and 6063B

Cost-effective for single input applications

Convenient optional front panel input connection

The 6060B and 6063B each provides one load input. This is more convenient for single input applications than a mainframe product.

These electronic loads are particularly suited for the lab bench. Entering commands manually using the front panel keypad is simpler because the channel does not need to be specified, as in a mainframe configuration. The keypad entry is further simplified because these products do not have the downloadable LIST feature of the N3300A Series, which helps to maximize production throughput. Extensive protection is included to help protect your valuable prototypes under test. This includes overvoltage, overcurrent, overtemperature, overpower, and reverse polarity.

These loads are suitable for manufacturing test systems where maximizing speed is not critical. They use industry standard SCPI instructions, and also have VXI*Plug&Play* drivers to simplify system design. For the greatest speed and accuracy in programming and measurement, see the N3300A series of DC electronic loads.

Specifications	6060B	6063B
Amperes	0 to 60 A	0 to 10 A
Volts	3 to 60 V	3 to 240 V
Maximum power (at 40° C)	300 W	250 W
Constant current mode		
Ranges	0 to 6 A, 0 to 60 A	0 to 1 A, 0 to 10 A
Accuracy	0.1% ±75 mA	0.15% ±10 mA
Regulation	10 mA	8 mA
Constant voltage mode		
Accuracy	0.1% ±50 mV	0.12% ±120 mV
Regulation (w/remote sense)	10 mV	10 mV
Constant resistance mode	0.033 to 1.0 Ω	0.20 to 24.0 Ω
Ranges	1 to 1,000 Ω 10 to 10,000 Ω	24 to 10,000 Ω 240 to 50,000 Ω
Accuracy	1 Ω: 0.8% ±8 mΩ (with ≥6 A at input) 1 KΩ: 0.3% ±8 mS (with ≥6 V at input) 10 KΩ: 0.3% ±8 mS (with ≥6 V at input)	24 Ω: 0.8% ±200 mΩ (with ≥1 A at input) 10 KΩ/: 0.3% ±0.3 mS (with ≥24 V at input) 50 KΩ: 0.3% ±0.3 mS (with ≥24 V at input)
Transient generator		
Frequency range Accuracy	0.25 Hz to 10 kHz 3%	0.25 Hz to 10 kHz 3%
Duty cycle range Accuracy	3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 6% of setting ±2%	3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 6% of setting ±2%
Current level high range Accuracy	60-A range: 0.1% ±350 mA	10-A range: 0.18% ±50 mA
Current level low range Accuracy	6-A range: 0.1% ±80 mA	1-A range: 0.18% ±13 mA
Voltage level Voltage level accuracy	3 to 60 V 0.1% ±300 mV	3 to 240 V 0.15% ±1.1 V
Readback specifications		
Current readback accuracy Voltage readback accuracy	0.05% ±65 mA ±(0.05% + 45 mV)	0.12% ±10 mA ±(0.1% + 150 mV)
Ripple and noise (20 Hz to 10 MHz noise) Current Voltage	 4 mArms 40 mA peak-to-peak 6 mVrms	 1 mArms 10 mA peak-to-peak 6 mVrms

More detailed specifications at **www.agilent.com/find/6060**

Single-Input: 250 W to 300 W (Continued)

Notes:

1. Operating temperature range is 0° to 55°C. All specifications apply for 25°C ±5°C, except as noted.
2. Maximum continuous power available is derated linearly from 40°C to 75% of maximum at 55°C.
3. DC current accuracy specifications apply 30 seconds after input is applied.

Specifications	6060B	6063B
Supplemental Characteristics	(Non-warranted characteristics determined by design that are useful in applying the product)	
Constant current mode	60-A range: 16 mA	10-A range: 2.6 mA
Resolution	6-A range: 1.6 mA	1-A range: 0.26 mA
Temperature coefficient	100 ppm/°C ±5 mA/°C	150 ppm/°C ±1 mA/°C
Constant voltage mode		
Resolution	16 mV	64 mV
Temperature coefficient	100 ppm/°C ±5 mV/°C	120 ppm/°C ±10 mV/°C
Constant resistance mode Resolution	1 Ω : 0.27 mΩ 1 KΩ: 0.27 ms 10 KΩ: 0.027 ms	24 Ω: 6 mΩ 10 KΩ: 0.011 ms 50 KΩ: 0.001 ms
Temperature coefficient	1 Ω: 800 ppm/°C ±0.4 mΩ/°C 1 KΩ: 300 ppm/°C ±0.6 ms/°C 10 KΩ: 300 ppm/°C ±0.6 ms/°C	24 Ω: 800 ppm/°C ±10 mΩ/°C 10 KΩ: 300 ppm/°C ±0.03 ms/°C 50 KΩ: 300 ppm/°C ±0.03 ms/°C
Transient generator		
Frequency range Resolution	0.25 Hz to 10 kHz 4% or less	0.25 Hz to 10 kHz 4% or less
Duty cycle range Resolution	3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4%	3 to 97% (0.25 Hz to 1 kHz) 6 to 94% (1 to 10 kHz) 4%
Current level high range Resolution	60-A range: 260 mA	10-A range: 43 mA
Current level low range Resolution	6-A range: 26 mA	1-A range: 4 mA
Current temperature coefficient	100 ppm/°C ±7 mA/°C	180 ppm/°C ±1.2 mA/°C
Voltage level resolution	260 mV	1 V
Voltage temperature coefficient	150 ppm/°C ±5 mV/°C	120 ppm/°C ±10 mV/°C
Programmable slew rate	60-A range: 1 A/ms to 5 A/µs 6-A range: 0.1 A/ms to 0.5 A/µs	10-A range: 0.17 A/ms to 0.83 A/µs 1-A range: 17 A/ms to 83 A/ms
Rise/fall time	12 µs to 8 ms	16 µs to 8 ms
Analog programming bandwidth	10 kHz (–3 dB frequency)	10 kHz (–3 dB frequency)
Analog programming accuracy		
Current (low range)	4.5% ±75 mA	3% ±8 mA
Current (high range)	4.5% ±250 mA	3% ±20 mA
Temperature coefficient	100 ppm/°C ±6 mA/°C	150 ppm/°C ±1 mA/°C
Voltage	0.8% ±200 mV	0.5% ±150 mV
Temperature coefficient	100 ppm/°C ±1 mV/°C	120 ppm/°C ±10 mV/°C
Analog programming voltage	0 to 10 V	0 to 10 V
Readback specifications	17 mA (via GPIB)	2.7 mA (via GPIB)
Current readback resolution	20 mA (front panel)	10 mA (front panel)
Temperature coefficient	50 ppm/°C ±5 mA/°C	100 ppm/°C ±1 mA/°C
Voltage readback resolution	17 mV (via GPIB) 20 mV (front panel)	67 mV (via GPIB) 100 mV (front panel)
Temperature coefficient	50 ppm/°C ±1.2 mV/°C	100 ppm/°C ±8 mV/°C

More detailed specifications at **www.agilent.com/find/6060**

Single-Input: 250 W to 300 W (Continued)

Notes:

1. Operating temperature range is 0° to 55°C. All specifications apply for 25°C ±5°C, except as noted.
2. Maximum continuous power available is derated linearly from 40°C to 75% of maximum at 55°C.
3. DC current accuracy specifications apply 30 seconds after input is applied.

Supplemental Characteristics (Non-warranted characteristics determined by design that are useful in applying the product)

(Continued)

Specifications	6060B	6063B
Analog monitor accuracy		
Current monitor (0 to 10 V_{out})	4% ±85 mA	3% ±10 mA
Temperature coefficient	50 ppm/°C ±6 mA/°C	100 ppm/°C ±1 mA/°C
Voltage monitor (0 to 10 V_{out})	0.25% ±40 mV	0.4% ±240 mV
Temperature coefficient	50 ppm/°C ±0.2 mV/°C	70 ppm/°C ±1.2 mV/°C
Remote sensing	5-VDC maximum between sense and load input	5-VDC maximum between sense and load input
Minimum operating voltage (at full rated current)	2 volts (1.2 V typical)	2 volts (1.2 V typical)
Programmable short	0.033 Ω (0.020 Ω typical)	0.20 Ω (0.10 Ω typical)
Programmable open (typical)	20 kΩ	80 kΩ
Drift (over 8-hour interval)		
Current	0.03% ±10 mA	0.03% ±15 mA
Voltage	0.01% ±10 mV	0.01% ±20 mV
DC isolation voltage	±240 VDC, between any input and chassis ground	±240 VDC, between any input and chassis ground
Digital inputs	V_{IL} = 0.9 V_{max} at I_{IL} = –1 mA / V_{IH} = 3.15 V_{min} (pull-up resistor on input)	V_{IL} = 0.9 V_{max} at I_{IL} = –1 mA / V_{IH} = 3.15 V_{min} (pull-up resistor on input)
Digital outputs	V_{OL} = 0.72 V_{max} at I_{OL} = 1 mA / V_{OH} = 4.4 V_{min} at I_{OH} = –20 µA	V_{OL} = 0.72 V_{max} at I_{OL} = 1 mA / V_{OH} = 4.4 V_{min} at I_{OH} = –20 µA
Net weight (approx.)	6.12 kg (13.5 lb)	6.12 kg (13.5 lb)
Shipping weight	8.16 kg (18 lb)	8.16 kg (18 lb)

More detailed specifications at **www.agilent.com/find/6060**

Single-Input: 250 W to 300 W (Continued)

Application notes

Agilent AN 372-1 Power Supply Testing
(AN 372-1)
5952-4190

Agilent AN 372-2 Battery Testing
(AN 372-2)
5952-4191

Pulsed Characterization of Power Semiconductors Using Electronic Loads
(AN 1246)
5091-7636E

Supplemental characteristics for all model numbers

Software driver:
VXI*Plug&Play*

Weight: 6.12 kg (13.5 lb) net;
8.16 kg (18 lb) shipping

Size: 425.5 mm W x 88.1 mm H x
396 mm D (16.75 in x 3.5 in x 13.7 in)

Warranty: One year

Ordering information

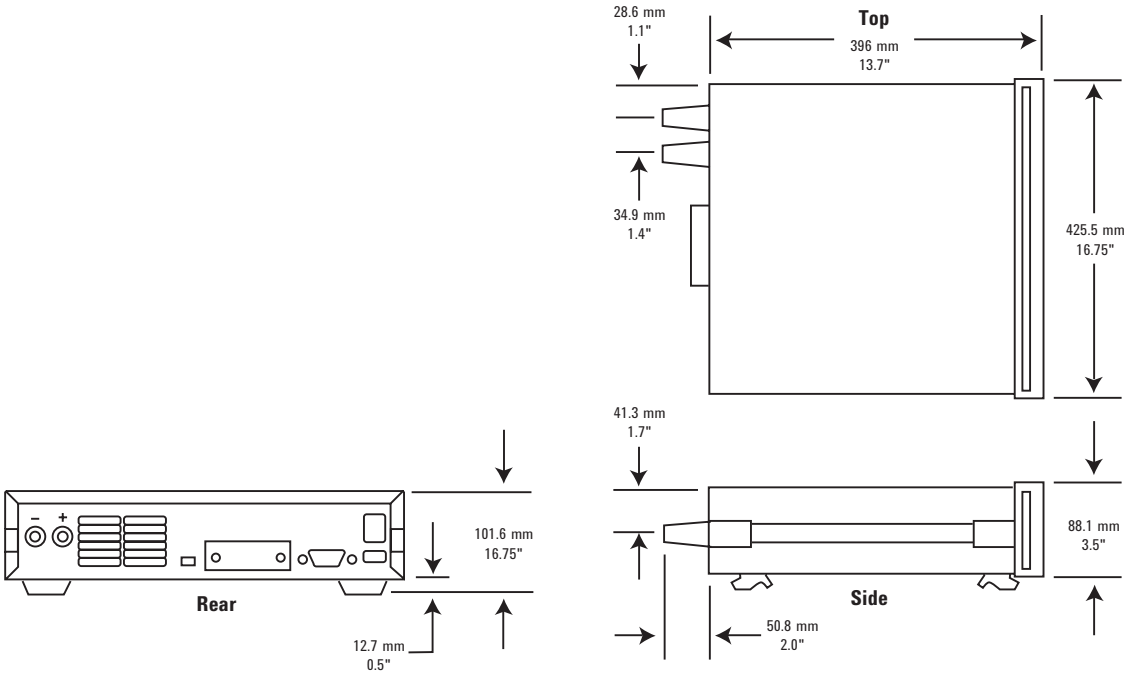
Opt 020 Front panel DC input connectors
Opt 100 87 to 106 VAC, 47 to 66 Hz input (for Japan only)
Opt 120 104-127 VAC, 47 to 66 Hz
Opt 220 191 to 233 VAC, 47 to 66 Hz input
Opt 240 209 to 250 VAC, 47 to 66 Hz input
* **Opt 908** Rack-mount kit (p/n 5062-3974C)
* **Opt 909** Rack-mount kit with handles (p/n 5063-9219)
Opt 0L1 Full documentation on CD-ROM, and printed standard documentation package
Opt 0L2 Extra copy of standard printed documentation package
Opt 0B0 Full documentation on CD-ROM only
Opt 0B3 Service manual

* Support rails required

Accessories

E3663AC Support rails for Agilent rack cabinets

Agilent Models: 6060B, 6063B



More detailed specifications at **www.agilent.com/find/6060**

AC Power Source/Analyzers...

an integrated AC power solution

Agilent AC power source/analyzers provide a complete AC test solution. As AC sources, they combine the capabilities of a power amplifier and an arbitrary waveform generator. This allows you to simulate normal waveforms and many types of distorted power waveforms. The built-in power analyzer combines the capabilities of a multimeter, oscilloscope, harmonic analyzer and power analyzer. These instruments may also be used to produce DC power, either alone or as a DC offset to an AC waveform.

AC Power Source/Analyzers
375-1750 VA

6811B, 6812B, 6813B

Provides a complete AC and DC power and measurement solution

Protect valuable DUTs with extensive protection features

Easy to use Graphical User Interface (GUI)

The Complete AC Power Test Solution

Since your product will have to operate in the real world of unpredictable AC power, you need to design and verify its correct operation under a wide range of AC power inputs. Brownouts, dropouts, sags, and other irregularities are not unusual in many communities today. Agilent AC sources have the features needed to easily accomplish this test goal either in an R&D environment or on the manufacturing test floor. If you plan to sell your products in a worldwide market, you will also need to test them at the line voltages and frequencies that they will eventually operate at. There is also additional testing needed to meet regulatory requirements for sale into some countries.

Agilent AC sources offer a complete solution for AC power testing, helping you to simplify this important task. These instruments combine the features of a power amplifier and arbitrary waveform generator to give you the ability to do all of the tests that you need. There are many standard preprogrammed waveforms, or you can use the transient generation system to simulate sophisticated and repeatable AC line disturbances. DC power can also be generated, either as a DC offset or as a pure DC signal.

Powerful Built-in Measurement Capabilities

Agilent AC sources have extensive 16-bit precision measurement capabilities which would normally require a number of complex measurement instruments, including a DMM (digital multimeter), oscilloscope, power analyzer, and harmonic analyzer. The precision measurements include:

- rms, DC, AC + DC voltage and current
- peak voltage and current
- real, apparent, and reactive power
- harmonic analysis of voltage and current waveforms providing amplitude and phase up to the 50th harmonic
- THD (total harmonic distortion)
- Triggered acquisition of digitized voltage and current

Using the measurement capabilities of an Agilent AC source simplifies your test setups and helps you obtain accurate data quickly.

Dual Power Analyzer Option 020

The powerful built-in power meter/analyzer in Agilent AC sources provides everything that you need to make AC measurements at the AC input to your DUT. For many test scenarios, this is the extent of the AC analysis required.

Some test scenarios, however, require AC measurements to be made at both the AC input and the AC output of the DUT. Option 020 provides an additional power analyzer, complete with a precision current shunt, which can be connected anywhere you need it. This second analyzer can even be used for tests where the AC source is not providing power, thus expanding the usefulness of this instrument to many more test configurations. The additional analyzer is equivalent in specifications and capabilities to the standard analyzer.

More detailed specifications at **www.agilent.com/find/6800**

AC Power Source/Analyzers: 375-1750 VA (Continued)

Using the dual power analyzer option instead of an additional power analyzer instrument externally is more than just convenient. Measurements on all four measurement channels (AC source output voltage and current, and dual power analyzer voltage and current inputs) are inherently synchronized with the AC source output waveform. This precision would be difficult to achieve using separate measurement instruments.

Examples dual power analyzer applications

- Complete testing of uninterruptible power sources (UPS)
- Efficiency testing of DC power supplies
- Efficiency testing of AC power sources
- Efficiency testing of transformers
- Safety testing of transformers
- Line disturbance and brownout testing of DC power supplies
- Line disturbance and brownout testing of AC power sources
- Sleep mode current monitoring
- Independent power analyzer

Sleep mode current monitoring
Many electronic products have power-saving or sleep modes. In this mode, the device draws only enough power to be able to recognize a "wake-up" signal, and then execute a smooth "wake-up". The power drawn in this mode is a critical parameter, and the ability to accurately monitor it is important.

The accessory precision current shunt that is supplied with option 020 is mounted in such a way to make it easy for you to replace it with a precision resistor of your choice. By doing this, you can configure the system to accurately monitor extremely low currents. This provides an easy way for you to profile the current draw in all modes of your product's operation. Since Agilent 6811B-6813B AC sources produce DC power as well as AC power, portable battery operated products can also be tested with this configuration.

UPS (uninterruptible power source) testing
The Dual Power Analyzer Option provides many important benefits for UPS testing. Since the key to correct UPS operation is having the output react properly to changes on the input, being able to monitor the output relative to the input simplifies testing. For example, commands are available to enable calculation of UPS transfer time, and the phase difference between the UPS input and output voltage. Agilent AC sources also have programmable output impedance, enabling the UPS designer to verify product stability over a wide range of AC line impedance.

Free Graphical User Interface (GUI)

When you need to run a variety of tests, study the results carefully, and then run more tests with slightly varied conditions, writing computer programs using the extensive SCPI command set may seem burdensome. This is when you should download the latest copy of the free Agilent AC Source Graphical User Interface from www.agilent.com.

The Agilent AC source GUI makes it quick and easy to set the output of your Agilent AC source, be it from a stored waveform or with a waveform that you create using your mouse. The GUI also allows you to see the output of the AC source in graphical form, save the results, or dump them directly into a Microsoft Excel file.

Microsoft Excel link
The direct Excel link feature was recently added to meet the current needs of R&D engineers. It makes it easy to keep the results of many tests, and makes them easily retrievable. With it, the test records resulting from changing conditions can be kept in one place and easily compared.

Access to raw data often helps in fully understanding test results. For example, small local peaks may not be evident in processed data. V, I and phase results from harmonic measurements are particularly susceptible to not showing the complete story in a graphical representation.

AC Power Source/Analyzers: 375-1750 VA (Continued)

Microsoft Excel offers a wide variety of data manipulation and graphical capabilities that can help an engineer gain the fullest understanding from the test data.

Test Suite for avionics equipment
Agilent AC sources are well suited for testing equipment intended for use in the avionics industry which operate at nominally 400 Hz. One of the special requirements that many manufacturers in this industry must concern themselves with is testing to meet RTCA DO-160 standards. These standards involve both AC and DC immunity tests. The Agilent AC source GUI includes a section devoted to these tests. By using this tool, you can quickly step through the required set-ups with confidence.

Extensive Protection to Prevent Load Damage

In addition to overcurrent, overvoltage, overpower and overtemperature protection, the 6800 series offers output disconnect relays and remote inhibit capability (quickly disabling the output of the AC source via a TTL signal) to protect the device under test.

The 6800 series is backed by a three-year warranty and Agilent's worldwide network of support and service centers.

Application Information

The 6800 series can help you test and improve your products. You can easily perform:

1. Static testing–generating and measuring voltage, frequency, and line current for meeting worldwide specifications.
2. Dynamic testing–generating AC line transients for limit testing and design verification.
3. Specialty testing–measuring current harmonic content and creating custom AC power waveforms (such as a combined AC + DC signal to simulate a telephone ring).
4. Precompliance regulatory testing–measuring current harmonics, voltage fluctuations and flicker emissions and generating voltage and frequency disturbances and interharmonics to determine product immunity.

Development engineers and test professionals in a wide variety of industries use AC power source/analyzers. Here are a few examples:

Avionics
Instrumentation, ATE test stations

Computer products
Computers, monitors, peripherals

Consumer products
Home appliances, audio and video equipment, heating/cooling controls

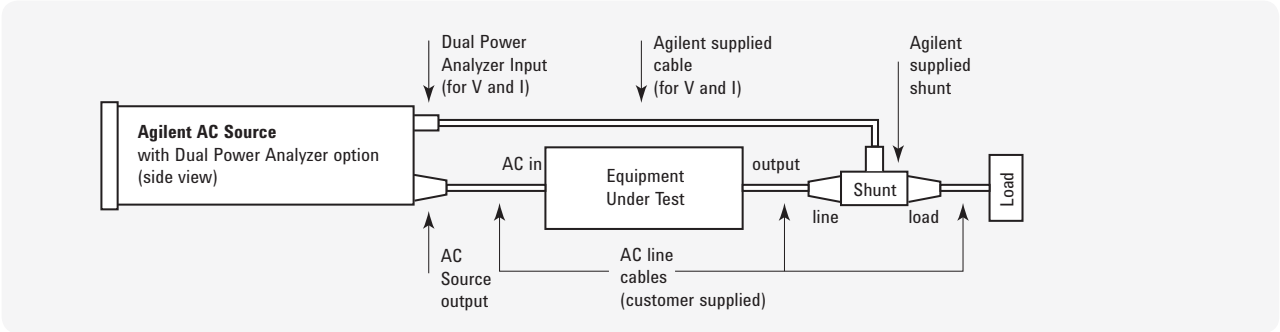
Electrical products
Relays, transformers, power components, fire alarms

Lighting products
Electronic ballasts, compact flourescent bulbs, timers

Motors
AC motors, electronic controllers

Power products
AC/DC adapters, AC/DC power supplies, PBX power supplies, Uninterruptible power supplies

Telecom products
RF amplifiers, CATV devices, MUX's, routers, switches

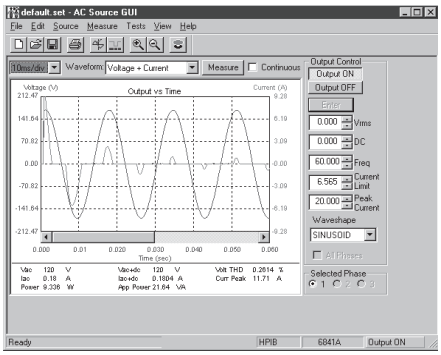


Test configuration of efficiency measurement using an Agilent AC source with the 020 Dual Power Analyzer Option.

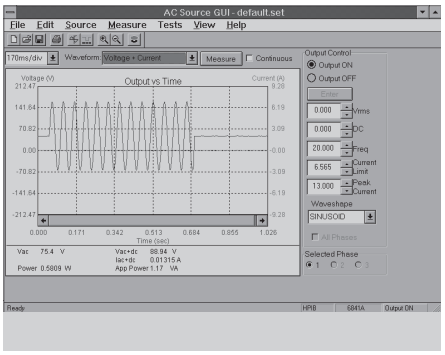
More detailed specifications at **www.agilent.com/find/6800**

AC Power Source/Analyzers: 375-1750 VA (Continued)

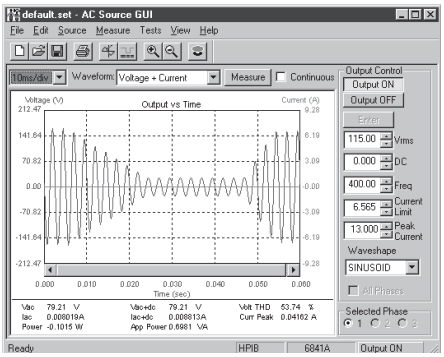
AC Source Graphical User Interface



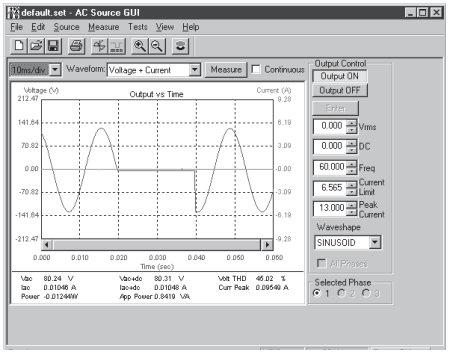
Inrush current measurement



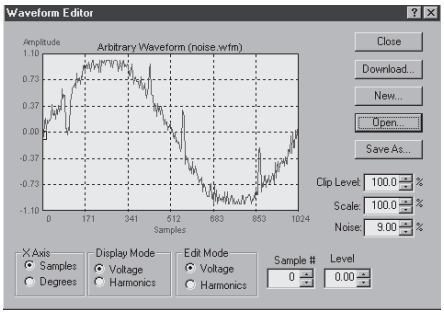
Ringer voltage (DC + AC) generation



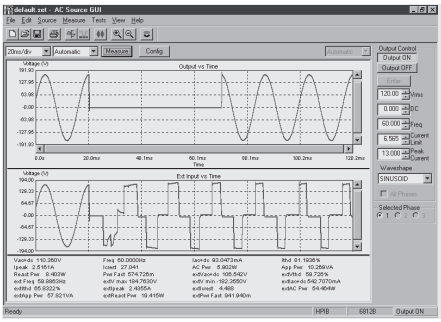
Voltage slew control (brownout)



One cycle AC mains dropout



User defined waveform: noise with spikes



Testing of UPS input and output using dual power analyzer Option 020

More detailed specifications at **www.agilent.com/find/6800**

AC Power Source/Analyzers: 375-1750 VA (Continued)

For a sine wave with a resistive load at 0° to 40°C, within an output frequency range of 45 Hz to 1000 Hz, and in AC coupled mode after a 30 minute warm-up unless otherwise noted.

Notes:

[1] Product may be operated between DC and 45 Hz subject to certain deratings. Measurements may be extended to 4.5 Hz at full accuracy only by selecting a digitization rate of 250 µs per point. Frequency content of the measured signal must be limited to 4 kHz or less to avoid aliasing effects.

Specifications (at 0° to 55°C unless otherwise specified)	**6811B**	**6812B**	**6813B**
Number of phases	1	1	1
Output ratings (Maximum)			
Power	375 VA	750 VA	1750 VA
rms voltage	300 V	300 V	300 V
rms current	3.25 A	6.5 A	13 A
Repetitive & non-repetitive peak current	40 A	40 A	80 A
Crest factor	12	6	6
Load power factor capability	0 to 1	0 to 1	0 to 1
DC power	285 W	575 W	1350 W
DC voltage	±425 V	±425 V	±425 V
DC current	2.5 A	5.0 A	10.0 A
Output frequency range[1]	DC; 45 Hz to 1 kHz	DC; 45 Hz to 1 kHz	DC; 45 Hz to 1 kHz
Constant voltage ripple and noise (20 kHz to 10 MHz)	-60 dB (relative to full scale)	-60 dB (relative to full scale)	-60 dB (relative to full scale)
Line regulation (% of full scale)	0.1%	0.1%	0.1%
Load regulation (% of full scale)	0.5%	0.5%	0.5%
Maximum total harmonic distortion	0.25% at 50/60 Hz 1% worst case 45 to 1 kHz	0.25% at 50/60 Hz 1% worst case 45 to 1 kHz	0.25% at 50/60 Hz 1% worst case 45 to 1 kHz
Programming accuracy	(25° ± 5°C)		
RMS voltage (% of output + offset)	0.15% + 0.3 V (45 - 100 Hz) 0.5% + 0.3 V (>100 - 500 Hz) 1% + 0.3 V (> 500 - 1000 Hz)	0.15% + 0.3 V (45 - 100 Hz) 0.5% + 0.3 V (>100 - 500 Hz) 1% + 0.3 V (> 500 - 1000 Hz)	0.15% + 0.3 V (45 - 100 Hz) 0.5% + 0.3 V (>100 - 500 Hz) 1% + 0.3 V (> 500 - 1000 Hz)
DC voltage	0.1% + 0.5 V	0.1% + 0.5 V	0.5% + 0.3 V
Frequency	0.01% + 10 µHz	0.01% + 10 µHz	0.01% + 10 µHz

More detailed specifications at **www.agilent.com/find/6800**

AC Power Source/Analyzers: 375-1750 VA (Continued)

For a sine wave with a resistive load at 0° to 40° C, within an output frequency range of 45 Hz to 1000 Hz, and in AC coupled mode after a 30 minute warm-up unless otherwise noted.

Notes:

[1] Product may be operated between DC and 45 Hz subject to certain deratings. Measurements may be extended to 4.5 Hz at full accuracy only by selecting a digitization rate of 250 µ seconds per point. Frequency content of the measured signal must be limited to 4 kHz or less to avoid aliasing effects.

[2] Select low measurement range for improved accuracy (10:1) for lower power measurements.

Specifications (at 0° to 55°C unless otherwise specified)	**6811B**	**6812B**	**6813B**
Measurement Accuracy	(25°C ±55°C)		
Rms. voltage (45 - 100 Hz)	0.03% + 100 mV[1]	0.03% + 100 mV[1]	0.03% + 100 mV[1]
DC voltage	0.05% + 150 mV[1]	0.05% + 150 mV[1]	0.05% + 150 mV[1]
RMS current (45 - 100 Hz)[2]			
High range	0.05% + 10 mA	0.05% + 10 mA	0.05% + 10 mA
Low range	0.05% + 1.5 mA	0.05% + 1.5 mA	0.05% + 1.5 mA
Power (VA) (45-100 Hz)[2]	0.1% + 1.5 VA +	0.1% + 1.5 VA +	0.1% + 1.5 VA +
High range	12 mVA/V	12 mVA/V	12 mVA/V
Low range	0.1% + 1.5 VA + 1.2 mVA/V	0.1 % + 1.5 VA + 1.2 mVA/V	0.1% + 1.5 VA + 1.2 mVA/V
Power (watts) (45-100 Hz)[2]	0.1% + 0.3 W +	0.1% + 0.3 W +	0.1% + 0.3 W +
High range	12 mW/V	12 mW/V	12 mW/V
Low range	0.1% + 0.3 W + 1.2 mW/V	0.1% + 0.3 W + 1.2 mW/V	0.1% + 0.3 W + 1.2 mW/V
Frequency	0.01% + 0.01 Hz	0.01% + 0.01 Hz	0.01% + 0.01 Hz
Power factor	0.01	0.01	0.01
Current magnitude Fundamental	0.03% + 1.5 mA	0.03% + 1.5 mA	0.03% + 1.5 mA
Low range Harmonics 2-49	0.03% + 1 mA + 0.2%/kHz	0.03% + 1 mA + 0.2%/kHz	0.03% + 1 mA + 0.2%/kHz
Current magnitude Fundamental	0.05% + 5 mA	0.05% + 5 mA	0.05% + 5 mA
High range Harmonics 2-49	0.05% + 3 mA + 0.2%/kHz	0.05% + 3 mA + 0.2%/kHz	0.05% + 3 mA + 0.2%/kHz
Supplemental Characteristics	(Non-warranted characteristics determined by design that are useful in applying the product)		
Average programming accuracy (% of output + offset) rms current	1.2% + 50 mA	1.2% + 50 mA	1.2% + 50 mA
Average programming resolution			
rms voltage	125 mV	125 mV	125 mV
DC voltage	250 mV	250 mV	250 mV
Overvoltage programming (OVP)	2 V peak	2 V peak	2 V peak
rms current	2 mA	4 mA	4 mA
Peak current	12.5 mA	25 mA	25 mA
Output frequency	10 µHz	10 µHz	10 µHz
Phase	N/A	N/A	N/A

More detailed specifications at **www.agilent.com/find/6800**

AC Power Source/Analyzers: 375-1750 VA (Continued)

For a sine wave with a resistive load at 0° to 40° C, within an output frequency range of 45 Hz to 1000 Hz, and in AC coupled mode after a 30 minute warm-up unless otherwise noted.

AC input ratings notes:

[1] Measured at low line

[2] Measured at high line

Application notes

Agilent 6800 Series AC Power Source/Analyzer
5963-7044E

Testing Uninterruptible Power Supplies Using Agilent 6800 Series AC Power Source/Analyzers
5967-6056E

Simplify your Avionics Testing with a 400 Hz Single Phase Power Source that includes a Built-in 26 V reference signal
5989-3700EN

Software driver:
VXI*Plug&Play*

Warranty: One year

Specifications (at 0° to 55°C unless otherwise specified)	6811B	6812B	6813B
Supplemental Characteristics (Continued)	(Non-warranted characteristics determined by design that are useful in applying the product)		
Average measurement resolution			
rms voltage	10 mV	10 mV	10 mV
rms current	2 mA	2 mA	2 mA
Programmable output impedance			
Resistance	0-1 Ω	0-1 Ω	0-1 Ω
Inductance	20 µh - 1 mh	20 µh - 1 mh	20 µh - 1 mh
Remote sense capability	Up to 1 Vrms can be dropped across each load lead.	Up to 1 Vrms can be dropped across each load lead.	Up to 1 Vrms can be dropped across each load lead.
Isolation to ground	300 Vrms/425 VDC	300 Vrms/425 VDC	300 Vrms/425 VDC
Net weight	28.2 kg (62 lb)	28.2 kg (62 lb)	32.7 kg (72 lb)
Shipping weight	31.8 kg (70 lb)	31.8 kg (70 lb)	36.4 kg (80 lb)
Dimensions	See drawings on page 115		
AC Input Ratings			
Voltage range (VAC) *default factory setting	87 to 106 VAC *104 to 127 VAC 174 to 220 VAC 191 to 254 VAC	87 to 106 VAC *104 to 127 VAC 174 to 220 VAC 191 to 254 VAC	174 to 220 VAC *191 to 254 VAC
Maximum input current (rms)[1]	12 A (100 VAC) 10 A (120 VAC) 7.5 A (200/208 VAC) 6.5 A (230 VAC)	28 A (100 VAC) 24 A (120 VAC) 15 A (200/208 VAC) 13 A (230 VAC)	22 A (200/208 VAC) 20 A (230 VAC)
Input power (max)[2]	1000 VA/700 W	2500 VA/1400 W	3800 VA/2600 W
Input frequency	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz

More detailed specifications at **www.agilent.com/find/6800**

AC Power Source/Analyzers: 375-1750 VA (Continued)

Ordering information

Opt 019 2000 VA AC power source/ analyzer (6813B only)

Opt 020 Dual power analyzer option

Opt 026 26 Volt, 0.1A auxiliary 45 to 100 Hz only reference output (6812B and 6813B)

Opt 0B0 Full documentation on CD-ROM only

Opt 0L1 Full documentation on CD-ROM, and/with printed standard documentation package

Opt 0L2 Extra copy of standard printed documentation package

Opt 1CM Rack-mount kit, p/n 5062-3977 (quantity 2) (support rails required)

Opt 1CP Rack-mount kit with handles, p/n 5062-3983 (support rails required) 6811B, 6812B, 6813B only

Support rails, p/n 12679B, required when rack mounting the 6811B, 6812B, and 6813B Opt 1CM and Opt 1CP. E3664AC non Agilent rack. E3663AS for Agilent rack.

Opt 100 (6811B and 6812B only) 87 to 106 VAC (100 VAC nominal), 47-63 Hz, Japan only

Opt 120 104-127 VAC (120 VAC nominal), 47-63 Hz

Opt 200 (6813B only) 174-220 VAC (200 VAC nominal), 47-63 Hz, Japan only

Opt 208 (6811B and 6812B only) 174 to 220 VAC (208 VAC nominal), 47-63 Hz

Opt 230 191 to 254 VAC (230 VAC nominal), 24-63 Hz

Opt 831 12 AWG, 200 to 240 VAC, unterminated (6812B, 6813B only)

Opt 832 4 mm^2 wire size, unterminated (6813B only)

Opt 833 1.5 mm^2 wire size, 200 to 240 VAC, unterminated (6812B only)

Opt 834 10 AWG, 100 to 120 VAC, unterminated (6812B only)

Opt 841 Line cord with NEMA L6-20P; 20 A, 250 V plug (6812B only)

Opt 842 Line cord with IEC 309; 32 A, 220 V plug (6813B only)

Opt 844 Line cord with NEMA L6-30P; 30 A, 250 V locking plug (6813B only)

Opt 845 Line cord with IEC 309; 16 A, 220 V plug (6812B only)

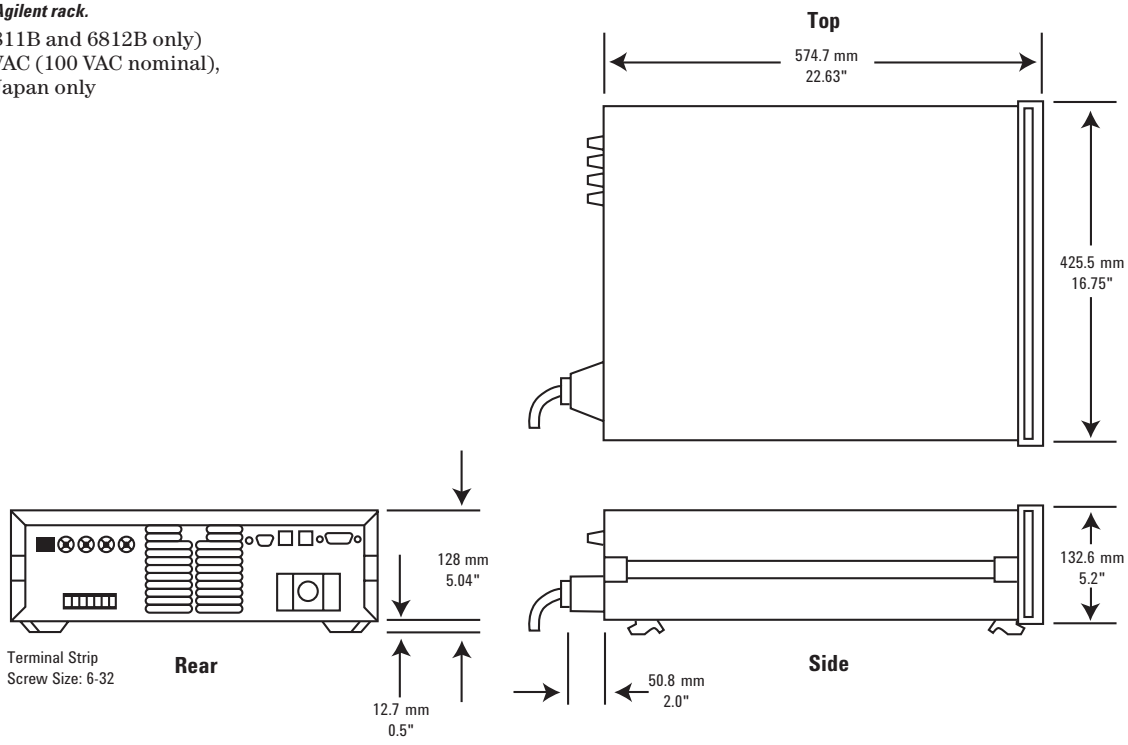
Opt 846 Line cord with NEMA L6-30P; 30 A, 120 V plug (6812B only)

Opt 847 Line cord with CEE 7/7; 16 A, 220 V plug (6812B only)

Opt 848 Line cord with BS 546; 15 A, 240 V plug (6812B only)

See the AC line voltage and cord section, for more details on line cords.

Agilent Models: 6811B, 6812B, 6813B



More detailed specifications at **www.agilent.com/find/6800**

Choosing AC Line Voltage and Cord Options for your Agilent Power Products

DC Power Supplies, DC Electronic Loads, and AC Sources

Choosing AC Line Voltage and Cord Options for Your Power Product

Power distribution systems, regulations, and connection techniques vary greatly among geographic regions as a result of local AC electrical standards. Most Agilent products, including power products which draw less than 500 watts of power from the AC line, can be readily adjusted to accept different line voltages or frequencies.

Line voltage and frequency for certain power products may not be field changeable. Choosing the correct voltage option for these products requires care. This is especially true for higher power products.

4 Easy Steps for Choosing Line Cord Options

Step 1

Go to the tables. Find the model number and the correct line cord option of the product you are ordering.

Line cords for low power products

Step 2

If your model number requires a 900 series line cord, the correct one will automatically be shipped for the destination country on the purchase order. DONE!

Line cords for high power products

Step 3

If your model number requires an 800 series line cord, determine if there is a line cord with plug that matches your outlet receptacle. If not, choose the appropriate unterminated line cord.

Step 4

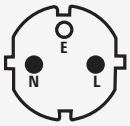
Add the option number for the appropriate line cord to your purchase order. DONE!

Low power products

For lower power products, a universal receptacle on the rear panel accepts a wide range of line cords to meet local regulatory requirements. The tables containing the 900 series line cords show a range of standard line cords that Agilent offers, with option numbers and part numbers.

Part numbers are needed to order a line cord separately.

For products which use the 900 series line cords, the appropriate type is automatically selected at time of shipment, based on the country to which the product is being shipped. If you plan to use your power products in a different country or region than the country to which the product is being shipped, you will need to specify the appropriate line voltage and line cord options on your order, so that we can provide the appropriate configuration. Contact your local Agilent Field Engineer for assistance.

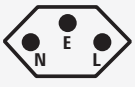
Cord Options	900	901	902	903	904
Product/Family					
	United Kingdom	Australia New Zealand	Europe Korea	United States Canada	United States Canada
6033A, 38A	8120-1351	8120-1369	8120-1689	8120-4383	8120-0698
6060B, 63B	8120-1351	8120-1369	8120-1689	8120-4383	8120-0698
6541A - 45A	8120-1351	8120-1369	8120-1689	8120-4383	8120-0698
6551A - 55A	8120-1351	8120-5412	8120-5413	8120-5337	8120-5421
6611C - 14C	8120-8705	8120-1369	8120-1689	8120-4383	8120-0698
6621A - 6629A	8120-1351	8120-1369	8120-1689	8120-4383	8120-0698
6631B - 34B	8120-8705	8120-1369	8120-1689	8120-4383	8120-0698
6641A - 45A	8120-1351	8120-1369	8120-1689	8120-4383	8120-0698
6651A - 55A	8120-1351	8120-5412	8120-5413	8120-5337	8120-5421
6811B	8120-1351	8120-5412	8120-1689	8120-5337	8120-5421
E3610 - 17A	8120-1351	8120-1369	8120-8768	8120-8767	8120-0698
E3620A	8120-1351	8120-1369	8120-8768	8120-8767	8120-0698
E3630A	8120-1351	8120-1369	8120-8768	8120-8767	8120-0698
E3631 - 34A	8120-1351	8120-1369	8120-8768	8120-8767	8120-0698
E3640 - 49A	8120-1351	8120-1369	8120-8768	8120-8767	8120-0698
N5741A - 52A	8120-1351	N/A	8120-1689	8120-4383	N/A
N6700B, N6701A - 02A N6705B	8120-1351	8120-1369	8120-1689	8120-4383[1]	8120-0698
N3300A - 31A	8120-1351	8120-1369	8120-1689	8120-4383	8120-0698

L = Line or active conductor (also called "live" or "hot")
N = Neutral or identified conductor
E = Earth or safety ground

[1] For model N6702A: Using 100-120 VAC limits total output power to 600 W. 200-240 VAC line is required to permit full 1200 W operation.

Choosing AC Line Voltage and Cord Options for your Agilent Power Products

DC Power Supplies, DC Electronic Loads, and AC Sources (Continued)

Cord Options	906	912	917	918	919
Product/Family					
	Switzerland	Denmark	South Africa India	Japan	Israel
6033A, 38A	8120-2104	8120-2956	8120-4211	8120-4753	8120-6800
6060B, 63B	8120-2104	8120-2956	8120-4211	8120-4753	8120-6800
6541A - 45A	8120-2104	8120-2956	8120-4211	8120-4753	8120-6800
6551A - 55A	8120-2104	8120-2956	8120-5414	8120-5342	8120-6800
6611C - 14C	8120-2104	8120-2956	8120-4211	8120-4753	8120-6800
6621A - 6629A	8120-2104	8120-2956	8120-4211	8120-4753	8120-6800
6631B - 34B	8120-2104	8120-2956	8120-4211	8120-4753	8120-6800
6641A - 45A	8120-2104	8120-2956	8120-4211	8120-4753	8120-6800
6651A - 55A	8120-2104	8120-2956	8120-5414	8120-5342	8120-6800
6811B	8120-2104	8120-2956	8120-5414	8120-5342	8120-6800
E3610 - 17A	8120-2104	8120-2956	8120-4211	8120-4753	8120-5181
E3620A	8120-2104	8120-2956	8120-4211	8120-4753	8120-5181
E3630A	8120-2104	8120-2956	8120-4211	8120-4753	8120-5181
E3631 - 34A	8120-2104	8120-2956	8120-4211	8120-4753	8120-5181
E3640 - 49A	8120-2104	8120-2956	8120-4211	8120-4753	8120-5181
N5741A - 52A	N/A	N/A	N/A	8120-4753	N/A
N6700B, N6701A - 02A N6705B	8120-2104	8120-2956	8120-1689	8120-5342[1]	8120-6800
N3300A, 31A	8120-2104	8120-2956	8120-4211	8120-4753	8120-6800

L = Line or active conductor (also called "live" or "hot")
N = Neutral or identified conductor
E = Earth or safety ground

[1] For model N6702A: Using 100-120 VAC limits total output power to 600 W. 200-240 VAC line is required to permit full 1200 W operation.

For more detailed specifications see the product manual at **www.agilent.com/find/power**

Choosing AC Line Voltage and Cord Options for your Agilent Power Products

DC Power Supplies, DC Electronic Loads, and AC Sources (Continued)

Cord Options	920	921	922	927
Product/Family				
	Argentina	Chile	China	Brazil Thailand
6033A, 38A	8120-6869	8120-6980	8120-8376	8120-8871
6060B, 63B	8120-6869	8120-6980	8120-8376	8120-8871
6541A - 45A	8120-6869	8120-6980	8120-8376	8120-8871
6551A - 55A	8120-6869	8120-6980	8120-8376	8120-8871
6611C - 14C	8120-6869	8120-6980	8120-8376	8120-8871
6621A - 6629A	8120-6869	8120-6980	8120-8376	8120-8871
6631B - 34B	8120-6869	8120-6980	8120-8376	8120-8871
6641A - 45A	8120-6869	8120-6980	8120-8376	8120-8871
6651A - 55A	8120-6869	8120-6980	8120-8376	8120-8871
6811B	8120-6869	8120-6980	8120-8376	8120-8871
E3610 - 17A	8120-6869	8120-6980	8120-8376	8120-8871
E3620A	8120-6869	8120-6980	8120-8376	8120-8871
E3630A	8120-6869	8120-6980	8120-8376	8120-8871
E3631 - 34A	8120-6869	8120-6980	8120-8376	8120-8871
E3640 - 49A	8120-6869	8120-6980	8120-8376	8120-8871
N5741A - 52A	N/A	N/A	8120-8376	N/A
N6700B, N6701A - 02A N6705B	8120-6869	8120-6980	8120-8376	8120-8871
N3300A, 31A	8120-6869	8120-6980	8120-8376	8120-8871

L = Line or active conductor (also called "live" or "hot")
N = Neutral or identified conductor
E = Earth or safety ground

For more detailed specifications see the product manual at **www.agilent.com/find/power**

High power products

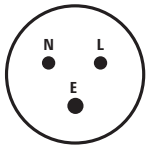
There are several factors which limit the amount of power which can be readily drawn from a normal branch circuit. For example, in the U.S., the typical 115/120 VAC branch circuit has a circuit breaker rated for 15 A. For industrial applications, 20 A service is commonly available.

Linear power supplies with outputs over 500 watts and switching supplies rated over 750 watts will generally exceed the capability of a 15 A branch circuit. Connecting power products above these power levels will require installing either a higher voltage or higher current service. Some practical examples are:

- standard line voltage for 2 kW products such as the 667XA is 230 VAC; they can not be powered off a 120 VAC line
- the 1KW 601XA and 603XA products cannot be powered off a standard 15 A/120 VAC circuit; they can operate off a 30 A/ 120 VAC service, or they can be configured for 208/240 VAC operation

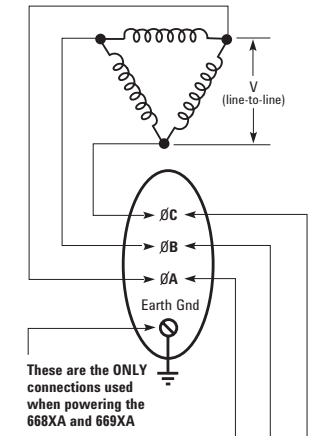
Agilent offers a range of 800 series line cords for many higher power products to mate with the wall receptacles commonly specified for these higher power services. Refer to the tables to determine if there is a 800 series line cord for your product with a plug that meets the local requirements. If not, you must order an unterminated line cord.

Cord Options	831	832	833	834
Product/Family	**No Plug #12AWG**	**No Plug 4 mm²**	**No Plug 1.5 mm²**	**No Plug #10AWG**
6030A, 31A, 32A, 35A	8120-5573	N/A	8120-5568	8120-5566
6571A - 75A	8120-5488	8120-5490	N/A	8120-5545
6671A - 75A	8120-5488	8120-5490	N/A	8120-5545
6812B	8120-5573	N/A	8120-5568	8120-5566
6813B	8120-5573	8120-6502	N/A	8120-5566
66000A	8120-5573	N/A	8120-5568	8120-5566
E4356A	8120-5488	8120-5490	N/A	8120-5545
N8731A-42A	8121-1949	8121-1331	N/A	N/A

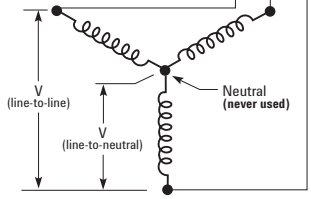
Cord Options	861	862	841	842
Product/Family	**No Plug (AWG)** N/S America, (AWG wire)	**No Plug (Metric)** Asia, Europe, Harmonized (metric wire)	**NEMA 6-20P #12AWG** N/S America Japan	 **IEC 309 32-A 4 mm²** Europe Korea
6030A, 31A, 32A, 35A	N/A	N/A	8120-5572	N/A
6571A - 75A	N/A	N/A	N/A	8120-5489
6671A - 75A	N/A	N/A	N/A	8120-5489
6680A - 84A	8121-6203	8120-6204	N/A	N/A
6690A - 92A	8121-0694	8121-0695	N/A	N/A
6812B	N/A	N/A	8120-5572	N/A
6813B	N/A	N/A	N/A	8120-6506
66000A	N/A	N/A	8120-5572	N/A
E4356A	N/A	N/A	N/A	8120-5489
N5761A-72A	8121-1330	8121-1331	N/A	N/A
N8731A-62A	8121-1946	8121-1948	N/A	N/A

Often, higher power products (over 1 kW) are hardwired, i.e. connected directly to a breaker panel or distribution box. The line cord may also be hard wired to the back of the power supply where a universal receptacle is impractical. Typically, a local electrician should be consulted to determine the best alternative to connect a high power product to the AC line.

Delta

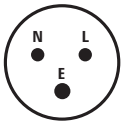
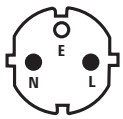


Wye



In a wye system

$$V_{(line\text{-}to\text{-}neutral)} = \frac{V_{(line\text{-}to\text{-}line)}}{\sqrt{3}}$$

Cord Options	844	845	846	847	848
Product/Family					
	NEMA L6-30P #10AWG N/S America Japan	**IEC 309 16-A 1.5 mm²** Denmark Switzerland Austria, China	**NEMA L5-30P #10AWG** N. America	**CEE 7/7 16-A 1.5 mm²** Europe Korea	**BS 546 15-A 1.5 mm²** India South Africa
6030A, 31A, 32A, 35A	N/A	8120-5570	8120-5565	8120-5567	8120-5569
6571A - 75A	8120-5546	N/A	N/A	N/A	N/A
6671A - 75A	8120-5546	N/A	N/A	N/A	N/A
6812B	N/A	8120-5570	8120-5565	8120-5567	8120-5569
6813B	8120-6507	N/A	N/A	N/A	N/A
66000A	N/A	8120-5570	8120-5565	8120-5567	8120-5569
E4356A	8120-5546	N/A	N/A	N/A	N/A

Note:
The countries or regions indicated here are for general guidance only. Local electrical codes governing wire size, wire type (AWG or metric) and plug type should be consulted to determine which of these available line cords/plugs is correct in your country to make proper connection to your AC mains. Please consult a qualified, licensed electrician for more information.

Products with 3-phase inputs
Some of the higher power products exceed the capability of a single phase line. Agilent offers several power products which require 3-phase inputs, including the 5 kW 668XA and 6.6 kW 669XA DC source family. For 3-phase power distribution up to the building, there are two different distribution systems in wide use: delta, predominantly used in the US; and wye predominantly used in Europe. However, for service inside the building, the 5 wire wye is the predominant configuration. Products which are delta loads, are compatible with either delta or wye. Agilent 3-phase products are delta loads.

In selecting the correct operating voltage for 3-phase products you need to distinguish between the line-to-line and the line-to-neutral voltages. The line-to-line voltage is the square root of 3 x the line-to-neutral voltage. It is the line-to-line voltage that is used to specify the input voltage to be applied to Agilent power products.

Power Products Applications Information

10 Most frequently asked questions about using DC power products
AC Power and Load Connections
Power Products Terms

10 Most frequently asked questions about using DC power products

1

How do I put the power supply in the constant current mode?

The power supply cannot be "put" into the constant current mode. The output settings of the power supply combined with the ohmic value of the particular load determine whether or not the power supply is in constant current.

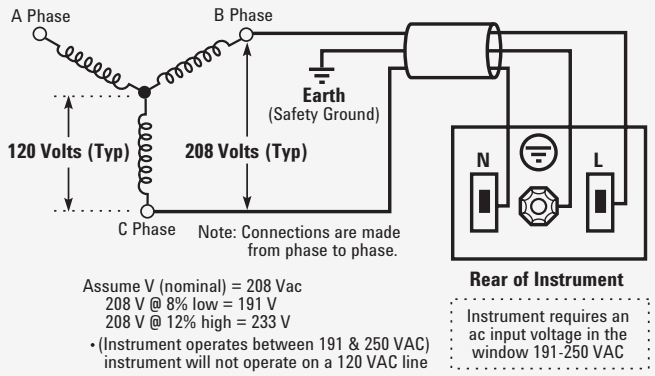
ie: The power supply inherently resides in the constant voltage mode. If the output voltage were set to 24 volts and a 6 Ω load were placed across the output terminals, Ohm's Law would require that 4 amps would flow (24 V/6 Ω). This presumes that the constant current setting of the power supply were set to a value greater than 4 amps; lets say 5 amps. Now, if the 6 Ω load were replaced by a 2 Ω load, Ohm's Law would suggest that 12 amps (24 V/ 2 Ω) would flow. However, the power supply is set to go into constant current at 5 amps. Therefore, the actual output voltage would be 10 volts (2 Ω x 5 A). The power supply will now remain in constant current for values of load = 0 Ω ≤ R < 4.8 Ω. Once the ohmic value of the load becomes greater than 4.8 Ω (24 V/5 A), the power supply will again revert to constant voltage operation at the value of 24 volts.

2

I have 208 VAC, 3ϕ phase power; can it be used to operate a product requiring 208 V single phase?

Yes, see below.

657xA/667xA connection to a 3-phase line



Assume V (nominal) = 208 Vac
208 V @ 8% low = 191 V
208 V @ 12% high = 233 V
• (Instrument operates between 191 & 250 VAC) instrument will not operate on a 120 VAC line

3

Why are the required Watts and VA so different?

Watts is a scalar quantity which is frequently used to measure system efficiency. It is the energy supplied by the utility company over a given period of time and is commonly referred to as power. Except for heavy industrial users, the utility company only bills users for the watts consumed. Watts are directly convertible into mechanical work or BTUs (British Thermal Units) of heat. Wasted power is paid for a second time in terms of additional loading on the user's air-conditioning system. Mathematically, it is a scalar quantity resulting from the vector product of two vector quantities (volts and amps). It is NOT the simple algebraic product of the rms volts times rms current.

VA on the other hand IS the scalar quantity resulting from multiplying the magnitudes (rms) of the vector

quantities (volts and amps). This resulting quantity will never be smaller than the watts demanded by an instrument. Uninformed users incorrectly use VA to assess the device's over-all efficiency and power demands. VA is most frequently and correctly used by electricians to determine proper AC mains conductor gage and circuit breaker sizing.

4

How much cooling do I need for my power supply?

Users frequently rack power supplies into an enclosure to supply power to some remotely located external load. Under these conditions, to properly determine the cooling requirements, the systems integrator needs thermal data from the manufacturer for the specific enclosure in question. This data is generally in the form of a curve which relates the rise of the enclosure's internal air temperature to the amount of power (or BTU's) dissipated within the enclosure.

The difference between the maximum power demanded by the external load, and the AC power demanded by the power supply to support the load's needs, is the power dumped into the internal air of the enclosure. Using this number and data for the enclosure, the internal rise can be determined. The internal rise added to the external ambient temperature will determine the temperature of the environment for the power supply. This must be within the ratings of the product or premature failure will occur.

A valuable conversion factor between Watts and BTU's is listed below:

1 BTU/Hr = 0.293 Watt

The N57xxA family draws cooling air from the outside of the rack. Thus, the air temperature is equal to that of the room's environment. Heated, cooling air is then exhausted into the inside of the rack. As a result, these instruments will not properly cool if the inside of the rack is "pressurized". The static air pressure within the rack must be equal to or less than the air pressure in the room's ambient.

5

Can Agilent power supplies sink current?

Yes! Sinking, or downprogramming, is the ability of a power supply to pull current into the positive power terminal. Sinking is necessary to discharge the power supply's own output capacitor, or the capacitors that are part of an external load.

Sinking is particularly important, for example, in printed circuit board test systems. The relays in test board systems typically must be switched only when the power supplies have discharged to zero volts, to avoid arcing and burn-out of the relay contacts. Sinking allows the power supply outputs to go to zero quickly, thus providing faster test times, an important factor for reducing overall test cost.

The value of the sink current is fixed and is not programmable, with the exception of the 6630 series, where sink current is set to the same value that is programmed for source current.

In general, sinking is provided to improve a power supply's transition time from a higher to a lower constant voltage operating level, and is not intended to be a steady-state operating condition.

Other models not listed here do not have high powered down programmers. Instead, they are capable of discharging the power supply output capacitors but not sinking current from the device under test.

Series	Current Sinking Capability
6620 Multiple Output	110% of source current rating
6630 100 Watt	110% of source current rating
6030 Autorangers	50 W/actual output voltage in volts or actual voltage in volts/0.05 ohms, whichever is less
6640 200 Watt	25% of source current rating
6650 500 Watt	20% of source current rating
6750/6760 50/100 Watt	Dynamically controlled to maximize output down-programming speed. 7 W continuous dissipation, 300 W peak.

Series	Current Sinking Capability
6670 2000 Watt	50 W/actual output voltage in volts or actual output voltage in volts/ 0.05 ohms, whichever is less
6680 5000 Watt	50 W/actual output voltage in volts or actual output voltage in volts/0.05 ohms, whichever is less
6690 6600 Watt	50 W/actual output voltage in volts or actual output voltage in volts/0.05 ohms, whichever is less

6

I want to put a microswitch on the safety cover over my UUT so that lifting the cover will program my ATE power supplies to zero volts and protect the operator from harm. Do Agilent power supplies have this capability?

Yes, many Agilent power supplies have a feature called "Remote Inhibit" (RI).

When connected to the RI input on the rear of the power supply, a contact closure or TTL low signal causes the output of the supply to shutdown and be programmed to zero volts. The power supply can also be set to generate a service request (SRQ) via the GPIB in the event that RI is pulled low.

7

Can I use Agilent electronic loads in series and in parallel?

Agilent electronic loads are designed to be operated in parallel for more current, but NOT in series for more voltage. Loads are fully protected against damage from current overloads, but will be damaged by voltage above the maximum voltage rating.

8

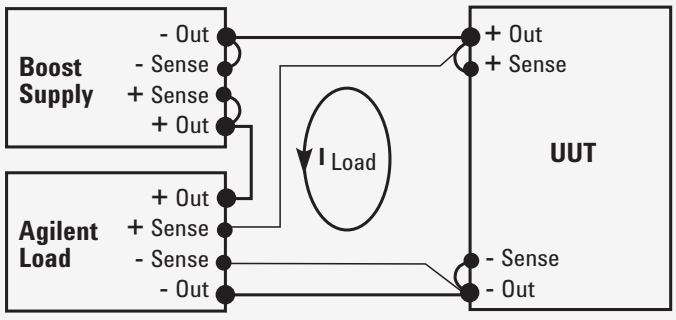
I must test a 1 volt power supply using a constant current load and I want to use Agilent electronic loads. But the Agilent load meets all of its dynamic specs with no derating on down to 3 volts. Below 2 volts, the Agilent load current must be linearly derated. What can I do?

Use a boost supply in series with the UUT. The load will now meet all its specs with no derating, because it always operates above 3 volts. (see the illustration below)

The boost supply can be a low-cost fixed output 3 V or 5 V supply with a current rating at least as high as the maximum peak load current needed. The 6641A (8 V, 20 A), 6651A (8 V, 50 A), 6671A (8 V, 220 A), or 6681A (8 V, 580 A) are all excellent choices.

The voltage setting of a programmable boost supply should be set to 3 volts, and the current limit set to full scale.

Select a boost power supply with low p-p ripple and noise. The constant current load will compensate for low-frequency p-p ripple and noise below a few kHz, but high frequency ripple and noise from the boost will appear across the UUT.



9

Why are Agilent's electronic loads constant resistance resolution speced in ohms on the low resistance range, but in mSiemens on the two higher ranges?

In general, Agilent's electronic loads are not a conventional "resistor". The loads consist of IC's, capacitors, resistors, FETs, etc. They were designed with two major circuits, a CV and CC circuit. These circuits are used to simulate resistance on the two upper ranges.

First, it is necessary to understand why there is a difference in the way in which the ranges are specified (mohms or ms). The constant resistance (CR) mode in the load actually operates using either the constant current (CC) or constant voltage (CV) circuits inside the load. The lowest CR range uses the CV regulating circuits, while the two higher ranges use the CC regulating circuits. It is because of these differences in the circuits used to regulate the load input that the specifications need to be different.

When the CV circuits are used, the load can be viewed as many resistors, all the same value (the resolution), in series to produce the desired resistance. Then, changing the resistance is like changing the number of discrete resistors in series. Therefore, the resolution is the value of one of these series resistors, and putting resistors in series changes the resistance measured in ohms. For the N3302A, the "discrete resistor" or resolution that can be programmed is 0.54 mohms in the 2 ohm range.

When the CC circuits are used, the load can be viewed as many resistors, all the same value (the resolution), in parallel to produce the desired resistance. Then, changing the resistance is like changing the number of discrete resistors in parallel. Therefore, the resolution is the value of one of these parallel resistors, and putting resistors in parallel changes the conductance measured in siemens. For the 60501B, the "discrete resistor" or resolution that can be programmed is 0.14 ms (=7.14 kohms).

For example, in the 2 kohm range, you can program the load input from 2 ohms to 2 kohms (0.5 s to 0.5 ms) with a resolution of 0.14 ms. This would be the equivalent of starting with about 3568 7.143 kohm resistors in parallel with each other, and in parallel with a 2 kohm resistor, and removing one at a time until you had only the 2 kohm resistor left.

Note that the resolution of the conductance is constant at 0.14 ms, however, the resolution of the total parallel resistance is not constant. It depends on how many resistors you have in parallel.

If you have two 7.143 kohm resistors in parallel and remove one, the resolution looks like 3571.5 ohms. If you have 3568 7.143 kohm resistors in parallel and remove one, the resolution looks like (7143/3567) - (7143/3568) = 0.561 mohms. But the conductance resolution is constant at 0.14 ms.

10

Can Agilent power supplies be programmed from 0 to full output voltage using a 0 to 10 V signal source?

Yes, many Agilent power supplies feature remote voltage programming or analog programming capability. However, there is a potential danger in analog programming any power supply, especially a high voltage supply. If the 0 to 10 V programming source is a typical, non-isolated, low-cost, digital-to-analog converter (DAC), it is probably grounded through its digital inputs and/or through the computer's internal power supplies, which are grounded through the computer's power cord. It's easy to overlook this, and the mistake can be very expensive.

If the DAC is non-isolated (or isolated only up to 42 V above ground) and one of the output terminals of the power supply is grounded, either directly or through the UUT, the output capacitor of the power supply can discharge through the computer backplane, motherboard, and the I/O common through the computer power cord ground. The resulting high current may even last long enough to vaporize the thin ground tracks on some or all of the printed circuit boards in the PC.

Be sure the programming source is electrically isolated, is operated from isolated power supplies, and is rated for floating voltages up to the full output voltage of the programmed supply. This is necessary so no one is hurt, and no equipment is damaged, no matter which output terminal of the power supply or UUT is grounded.

For additional questions and answers visit our web site at www.agilent.com/find/answers

AC Power and Load Connections

A modern stabilized DC power supply is a versatile high performance instrument capable of delivering a constant or controlled output reliably and with little attention. But to take full advantage of the performance characteristics designed into a supply, certain basic precautions must be observed when connecting it for use on the lab bench or installing it in a system. Factors such as wire ratings, system grounding techniques, and the particular way that AC input, DC output, and remote error sensing connections are made can contribute materially to obtaining the stable, low noise output expected by the user. Careful attention to the following guidelines can help to ensure the trouble free operation of your Agilent power supply.

AC Power Input Connections

Wire Rating

RULE 1. When connecting AC power to a power supply, always use a wire size rated to carry at least the maximum power supply input current.

If a long cable is involved, make an additional check to determine whether a still larger wire size might be required to retain a sufficiently low impedance from the service outlet to the power supply input terminals. As a general guideline, input cables should be of sufficient size to ensure that the voltage drop at maximum rated power supply input current will not exceed 1% of the nominal line voltage.

Continuity

RULE 2. Maintain the continuity of the AC, acc, and grounding wires from the AC power outlet to the power supply input terminals without an accidental interchange.

Interchanging the AC and grounding wires may result in the power supply chassis being elevated to an AC potential equal to the input line voltage. If the chassis is grounded elsewhere, the result may be no worse than some blown fuses. But if the chassis is not grounded, the result could be a potentially lethal shock hazard. Confirm that the chassis is grounded by the grounding wire.

Transformers

RULE 3. If an autotransformer or an isolation transformer is connected between the AC power source and the power supply input terminals, it should be rated for at least 200% of the maximum rms current required by the power supply.

The transformer must have a higher rating than would be suggested by the supply's rms input current because a power supply input circuit does not draw current continuously. Input current peaks can cause a smaller transformer to saturate, resulting in failure of the supply to meet its specifications at full output.

RULE 4. Be sure to connect the common terminal of an autotransformer to the acc (and not the AC) terminals of both the power supply and the input power line.

If acc is not connected to the common terminal of the autotransformer, the power supply's input acc terminal will have a higher than normal AC voltage connected to it, contributing to a shock hazard and, in some instances, a greater output ripple.

AC Line Regulator

RULE 5. Do not use an AC line regulator at the input to a regulated power supply without first checking with the power supply manufacturer.

Some regulators tend to increase the impedance of the line in a resonant fashion and can cause power supplies to malfunction, particularly if they use SCR or switching regulators or preregulators. Moreover, since the control action of many line voltage regulators is accompanied by a change in the output waveshape, their advantage in providing a constant rms input to a power supply is small. In fact these changes in waveshape are often just as disruptive in causing power supply output changes as the original line voltage amplitude changes would have been.

AC Power and Load Connections (Continued)

Load and Remote Error Sensing Connections

Making Load Connections to One Power Supply

The simplest and most common example of improper load wiring is shown in Figure 1. The voltage at each load depends on the current drawn by the other loads and the voltage drops they cause in some portion of the load leads. Since most load currents vary with time, an interaction among the loads results. This interaction can sometimes be ignored, but in most applications the resulting noise, pulse coupling, or tendency toward inter-load oscillation is unacceptable. The following thirteen steps describe a recommended procedure for connecting the load wiring, grounding the system in a manner that avoids troublesome ground loops, and making connections for remote error sensing.

STEP 1. Select a load wire size that, as an absolute minimum, is heavy enough to carry the power supply output current that would flow if the load terminals were short-circuited.

This is the minimum, however. Impedance and coupling considerations usually dictate the use of load wires larger than would be required just to satisfy current rating requirements. In general, the power supply performance degradation seen at the load terminals becomes significant when the wire size and length result in a load wire impedance comparable to or greater than the effective output impedance of the power supply. Refer to a copper wire resistance table to see if a larger wire size might have to be used to attain an impedance comparable to or smaller than the output impedance of the power supply.

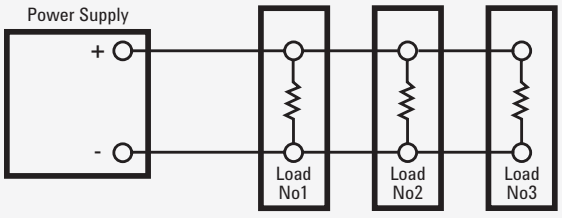


Figure 1
Improper load connections

If multiple loads are supplied from a pair of DC distribution terminals not located at the power supply terminals, it is necessary to consider separately the mutual impedance of the wires connecting the power supply to the distribution terminals and the additional impedance of the wires to each individual load. The mutual impedance presents an opportunity for a variation of one load current to cause a DC voltage variation at another load. Fortunately this mutual impedance can be effectively reduced at DC and at low frequencies by using remote error sensing, as will be described later.

Connect the Load Wiring

STEP 2. Designate a single pair of terminals as the positive and negative DC distribution terminals.

These two terminals might be the power supply output terminals, the load terminals, or a separate pair of terminals established expressly for distribution. If the power supply is a short distance from the load and remote sensing will not be used, locate the DC distribution terminals as near as possible to the power supply output terminals. Using the power supply output terminals themselves as the distribution terminals results in optimum performance.

If remote sensing is to be used, locate the DC distribution terminals as near as possible to the load terminals. Later in the procedure, sensing leads will be connected from the power supply sensing terminals to the DC distribution terminals as shown in Figure 2.

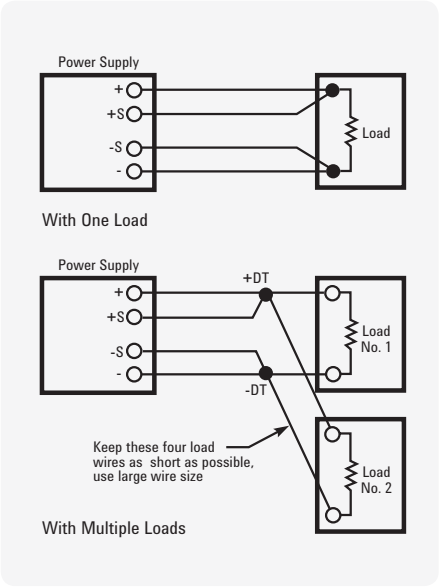


Figure 2
Location of DC distribution terminals with remote sensing (distribution terminals are shown solid)

STEP 3. Connect one pair of wires directly from the power supply output terminals to the DC distribution terminals, and connect a separate pair of wires from the distribution terminals to each load.

There should be no direct connection from one load to another except by way of the DC distribution terminals. (Although for clarity the diagrams show the load and sensing leads as straight lines, some immunity against pick-up from stray magnetic fields can be obtained by twisting each pair of load leads and shielding all sensing leads.)

Decouple Multiple Loads

STEP 4. If required, connect a local decoupling capacitor across each pair of distribution and load terminals.

Load decoupling capacitors are often needed when multiple loads draw pulse currents with short rise times. To reduce high frequency mutual coupling effects under these circumstances, capacitors must be connected directly across the load and distribution terminals. The capacitors used for decoupling must be selected to have a high frequency impedance that is lower than the impedance of the wires connected to the same load, and their connecting leads must be kept as short as possible to minimize impedance.

Grounding the System

Since no two ground points have exactly the same potential, the idealized concept of a single ground potential is a snare and a delusion. In many cases the potential difference is small, but a difference in two ground potentials of even a fraction of a volt could cause amperes of current to flow through a complete ground loop. (Ground loop is a term used to describe any conducting path formed by two separate connections to ground). Ground loops can cause serious interference problems when voltages developed by these currents are coupled into sensitive signal circuits.

To avoid ground loop problems, there must be only one ground return point in a power supply system. (A power supply system includes the power supply, all of its loads, and all other power supplies connected to the same loads). The selection of the best ground return point depends on the nature and complexity of the DC wiring. In large systems, practical problems frequently tend to force compromises with the ideal grounding concept. For example, a rack mounted system consisting of separately mounted power supplies and loads generally has multiple ground connections. Each instrument usually has its own chassis tied to the third grounding wire of its power cord, and the rack is often connected by a separate wire

to ground. With the instrument panels fastened to the rack frame, circulating ground currents are inevitable. However, as long as these ground currents are confined to the ground system and do not flow through any portion of the power supply DC distribution wiring, their effect on system performance is usually negligible. To repeat, separating the DC distribution circuits from any conductive paths in common with ground currents will in general reduce or eliminate ground loop problems. The only way to avoid such common paths is to connect the DC distribution system to ground with only one wire. Figure 3 illustrates this concept: DC and signal currents circulate within the DC system, while ground loop currents circulate within the ground system. Steps, 5, 6, and 7 make specific recommendations for avoiding ground loop problems.

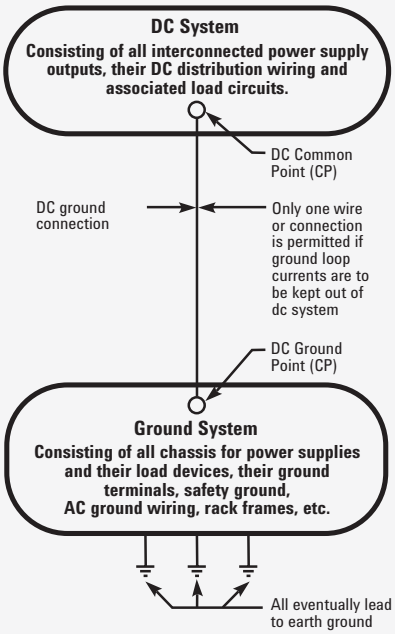

DC System
Consisting of all interconnected power supply outputs, their DC distribution wiring and associated load circuits.
DC Common Point (CP)
DC ground connection
Only one wire or connection is permitted if ground loop currents are to be kept out of dc system
DC Ground Point (CP)
Ground System
Consisting of all chassis for power supplies and their load devices, their ground terminals, safety ground, AC ground wiring, rack frames, etc.
All eventually lead to earth ground

Figure 3
Isolating ground loop paths from the DC system

Select the DC Common Point

STEP 5. Designate one of the DC distribution terminals as the DC common point.
There should be only one DC common point in a DC system. If the supply is to be used as a positive source, then the negative DC distribution terminal is the DC common point. If it is to be a negative source, then the positive DC distribution terminal is the DC common point. Here are some additional suggestions for selecting the best DC common point for five different classes of loads:

a. Single isolated load.
A single isolated load exists when a power supply is connected to only one load and the load circuit has no internal connections to the chassis or ground. If the power supply output terminals are to be used as the DC distribution terminals, then the DC common point will be either the positive or negative power supply output terminal (Figure 4A). If remote sensing is to be used and the load terminals will serve as the distribution terminals, then either the positive or negative load terminal will be the DC common point (Figure 4B).

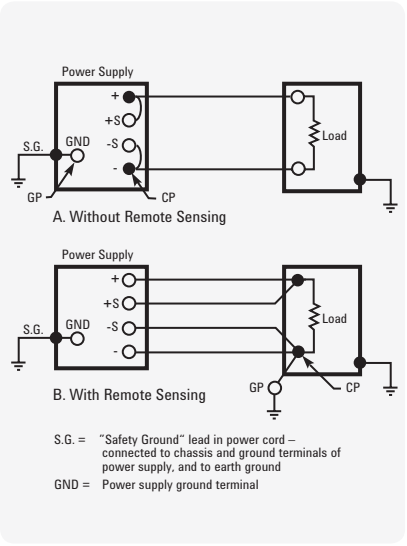


Figure 4
Preferred ground connections for a single isolated load

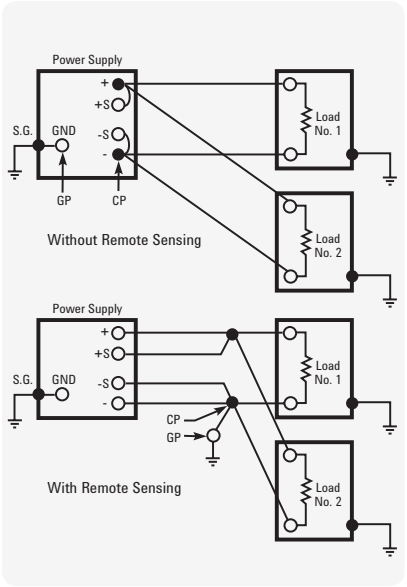


Figure 5
Preferred ground connections for multiple ungrounded loads

b. Multiple ungrounded loads.
This alternative applies when separate pairs of load leads connect two or more loads and none of the load circuits has an internal connection to chassis or ground (Figure 5). Use the positive or negative DC distribution terminal as the DC common point.

c. Single grounded load.
When a power supply is connected to a single load that has a necessary internal connection to chassis or ground as in Figure 6, or when a supply is connected to multiple loads only one of which has a necessary internal connection to chassis or ground as in Figure 7, the load terminals of the grounded load must be designated the DC distribution terminals, and the grounded load terminal is necessarily the DC common point.

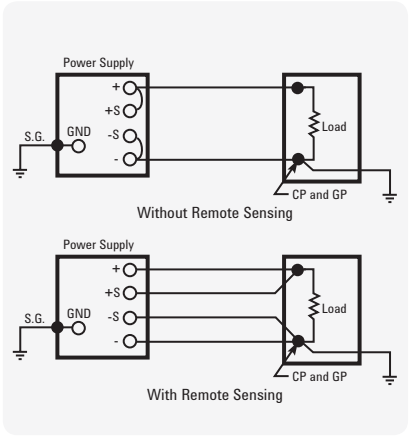


Figure 6
Preferred ground connections for a single grounded load

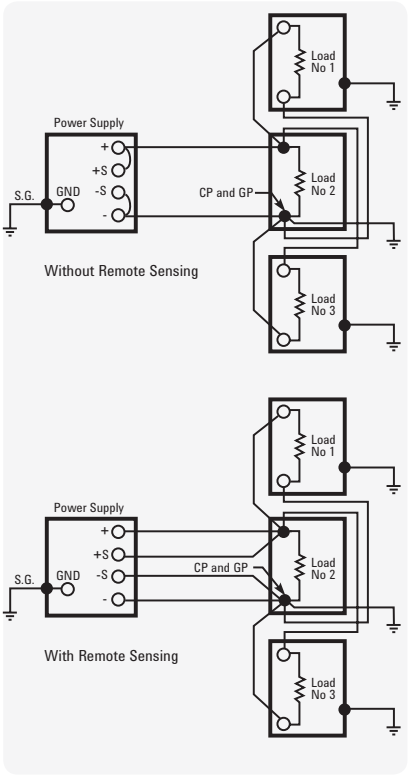


Figure 7
Preferred ground connections for multiple loads, only one of which is grounded internally

d. Multiple Loads, Two or More of Which are Individually Grounded.
This undesirable situation must be eliminated if at all possible. Ground loop currents circulating through the DC and load wiring cannot be avoided so long as separate loads connected to the same power supply or DC system have separate ground returns as shown in Figure 8.

One possible solution is to break the ground connection in all of the loads and then select the DC common point using the multiple ungrounded load alternative as in (b) above. Another would be to break the ground connection in all but one of the loads and select the DC common point as in alternative (c). If there are two or more loads with ground connections that cannot be removed and the system is susceptible to ground loop problems, then the only satisfactory solution is to increase the number of power supplies and to operate each grounded load from a separate supply. Each combination of power supply and grounded load would be treated as in alternative (c).

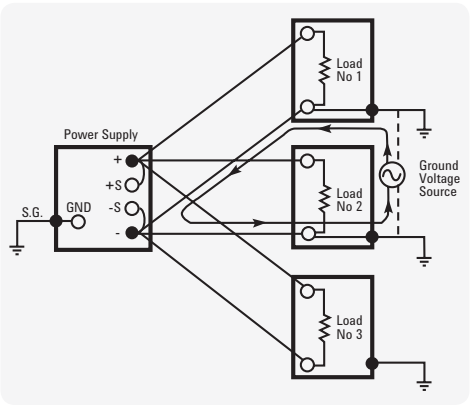


Figure 8
Improperly connected DC distribution system with two grounded loads forming a ground loop

AC Power and Load Connections (Continued)

e. Load system floated at a DC potential above ground.
It is sometimes necessary to operate the power supply output at a fixed voltage above or below ground potential. The usual procedure in these circumstances is to designate a DC common point using whichever of the preceding four alternatives is appropriate, just as though conductive grounding were to be used. Then connect this DC common point to the DC ground point through a 1 microfarad capacitor as shown in Figure 9.

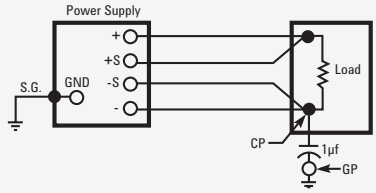


Figure 9
Floating a load system at a DC potential above ground

Select the DC Ground Point

STEP 6. Designate the terminal that is connected to ground as the DC ground point.

The DC ground point can be any single terminal, existing or added, that is conductively connected to the ground of the building wiring system and then eventually to earth ground.

STEP 7. Connect the DC common point to the DC ground point, making certain there is only one conductive path between these two points.

Make this connection as shown in Figures 4, 5, 6, or 7. Make the connection as short as possible and use a wire size such that the total impedance from the DC common point to the DC ground point is not large compared with the impedance from the ground point to earth ground. Flat braided leads are sometimes used to further reduce the high frequency component of the ground lead impedance.

Making Remote Error Sensing Connections

Normally a power supply operating in the constant voltage mode achieves its optimum line and load regulation, its lowest output impedance, drift, and PARD, and its fastest transient recovery performance at the power supply output terminals. If the load is separated from the output terminals by any lead length (as in Figure 10), some of these performance characteristics will be degraded at the load terminals-usually by an amount proportional to the impedance of the load leads compared with the output impedance of the power supply.

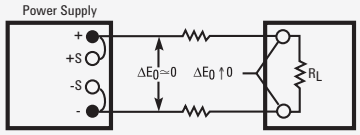


Figure 10
Load voltage variations caused by load lead voltage drops when remote error sensing is not used

With remote error sensing, a feature included in nearly all Agilent power supplies, it is possible to connect the input of the voltage feedback amplifier directly to the load terminals so that the regulator performs its function with respect to the load terminals rather than with respect to the power supply output terminals. Thus, the voltage at the power supply output terminals shifts by whatever amount is necessary to compensate for the voltage drop in the load leads, thereby maintaining the voltage at the load terminals constant (Figure 11).

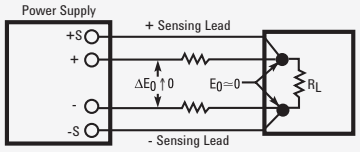


Figure 11
Regulated power supply with remote error sensing

Making the Sensing Connections

STEP 8. Remove the jumper connections between the power supply sensing and output terminals, and connect the power supply sensing terminals to the DC distribution terminals as shown in Figure 12.

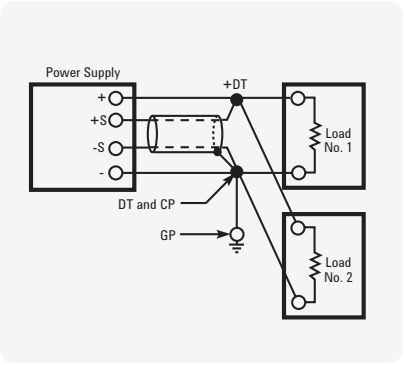


Figure 12
Properly grounded power supply system with remote error sensing

Use an insulated shielded pair for the sensing leads. Do not use the shield as one of the sensing conductors.

STEP 9. Connect one end of the sensing lead shield to the DC common point and leave the other end unconnected.

In nearly all cases this method of connecting the sensing shield minimizes ripple at the DC distribution terminals.

Protect Against Open Sensing Leads Step

STEP 10. Avoid the possibility of an open remote sensing path, either on a long-term or a transient basis.

Opening a sensing lead causes the power supply output voltage to increase. Protective circuits in the supply provide some load protection by limiting the amount of the increase, but eliminating all switch, relay, or connector contacts from the remote sensing path helps to minimize the possibility of any loss of regulation due to this cause.

Check the Load Wire Rating

STEP 11. Verify that the voltage drop in the load leads does not exceed the capabilities of the remote sensing circuit.

Most well regulated power supplies have an upper limit to the load lead voltage drop around which remote sensing can be connected without losing regulation. This maximum voltage drop is typically 0.5, 1, or 2 volts, and may apply to the positive, the negative, or both the positive and negative output leads. See the instruction manual for the exact load lead voltage drop limitations of a particular power supply.

Remember too, that any voltage drop lost in the load leads reduces the maximum voltage available for use at the load. Either of these limitations sometimes dictates the use of a larger wire size than would be required by wire current rating or impedance considerations.

Check for Power Supply Oscillation

STEP 12. Verify that the power supply does not oscillate when remote sensing is connected.

Although DC and low frequency performance are improved by remote sensing, phase shifts associated with long load and sensing leads can affect the stability of the feedback loop seriously enough to cause oscillation. This problem can frequently be corrected by readjusting a "transient recovery" or "loop stability" control inside the supply if the circuit includes one; follow the adjustment procedure in the manual. Another remedy that is often effective is to disconnect the output capacitor inside the power supply (some models have a rear panel jumper that can be removed for this purpose) and to connect a similar capacitor across the DC distribution terminals.

Check for Proper Current Limit Operation

STEP 13. Check that the operating point of the current limit circuit has not been affected by the remote sensing connections.

With some power supply designs, the resistance of one of the output conductors adds to the resistance used for current limit monitoring when remote sensing is used. This reduces the threshold value at which current limiting begins and makes readjustment of the current limit

circuit necessary. To determine whether connecting remote sensing has changed the current limit setting, turn off the supply, short terminal -S to -OUT and +S to +OUT at the power supply, and check whether the current limit value differs from the value without these terminals shorted. If it does differ significantly, the current limit control needs readjustment.

Making Load Connections to Two or More Power Supplies in the Same System

The following four rules must also be observed in extending the preceding techniques to systems containing two or more power supplies.

DC Distribution Terminals

RULE 1. There must be only one point of connection between the DC outputs of any two power supplies in the multiple power supply system. This point must be designated as one of the two DC distribution terminals for those two power supplies.

Thus there are always exactly (N+1) DC distribution terminals in any system, where N is the number of power supplies. (This is true unless parallel supplies share the same distribution terminals, or supplies are connected in series with no other connections to their intermediate terminals).

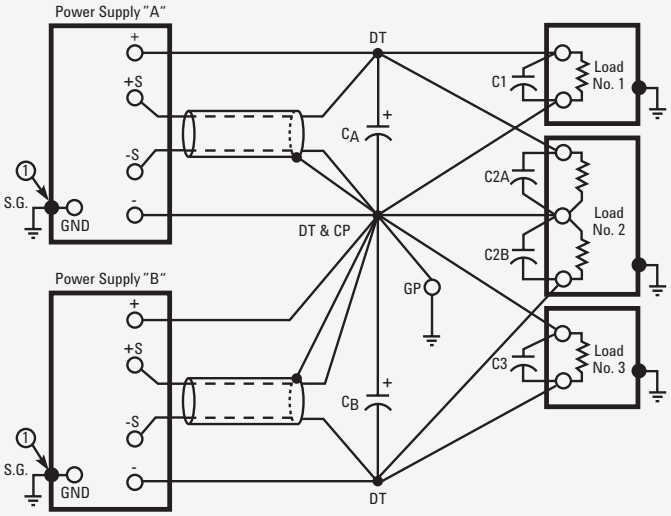


Figure 13
A properly connected multiple power supply system

DC Common Point

RULE 2. One of the (N+1) DC distribution terminals must be designated as the DC common point for the system.

There can be only one DC common point allowed in a system.

DC Ground Point

RULE 3. There must be only one DC ground point in a multiple power supply system.

This rules out the possibility of connecting two grounded loads in the same system.

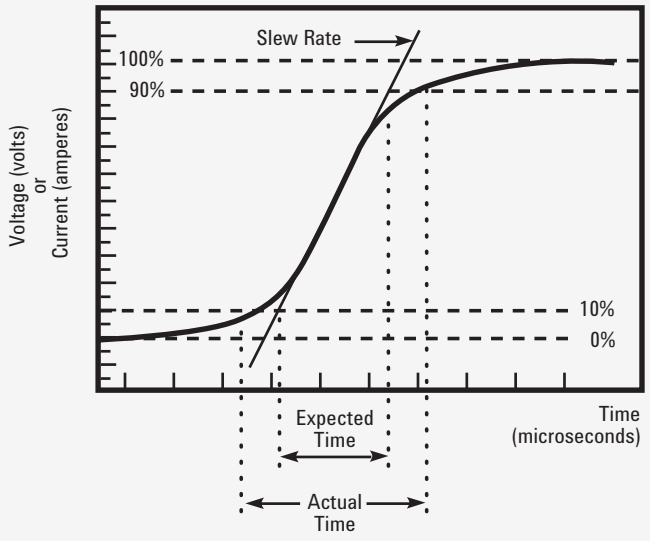
RULE 4. There must be only one conductive path between the system DC common point and the system DC ground point.

This rule is repeated from Step 7 above as a reminder because of the far greater number of possible paths to ground in a multiple power supply system. Figure 13 shows an example of a properly connected and grounded multiple power supply system.

Power Products Terms

AC input current: the maximum current into the power supply or electronic load. The current specified is worst case (low line voltage, full output).

Actual transition time: for an electronic load, either the total slew time (voltage or current change divided by slew rate - time) or the minimum transition time, whichever is longer.



Risetime transition limitation

Ambient temperature: the temperature of the air immediately surrounding the power supply or electronic load.

Analog programming: controlling the output voltage and/or current with an analog signal. This signal could be a voltage, current or resistance. This is similar to using the power supply as an amplifier.

Auto-parallel operation: a master-slave connection of the outputs of two or more supplies or the inputs of two or more electronic loads used for obtaining a current rating greater than can be obtained from a single load or supply. Only supplies that have the same voltage and current ratings should be paralleled.

Auto-ranging power supply: a power supply that can provide maximum rated power over a wide and continuous range of voltage and current settings.

Auto-series operation: a master-slave connection of the outputs of two or more supplies used for obtaining a voltage greater than can be obtained from one supply. Only supplies that have the same voltage and current ratings should be connected in series.

Auto-tracking operation: a master-slave connection of two or more supplies each of which has one of its output terminals in common with one of the output terminals of all of the other supplies.

Command processing time: the average time required for a power supply output voltage, or electronic load input voltage or current, to begin to change following receipt of a voltage or current set command over GPIB. This is effectively the time it takes for the power supply or electronic load to interpret the voltage set command and initiate a response.

Common mode noise: the current flowing from either output terminal (+ and –) through the power supply to chassis ground.

Compliance voltage: the output voltage of a power supply operating in the constant-current mode.

Constant-current (CC) mode: a power supply that stabilizes output current with respect to changes in load impedance. Thus, for a change in load resistance, the output current remains constant while the output voltage changes by whatever amount necessary to accomplish this.

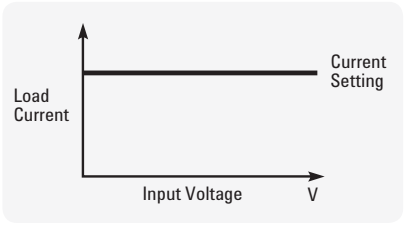
Power Products Terms (Continued)

Constant-current/voltage/resistance mode electronic load: an electronic load that can operate in one of the following ways:

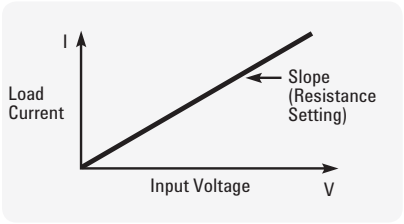
CC= ratio of voltage to current in accordance with the programmed value regardless of the input voltage

CV= ratio of voltage to current in accordance with the programmed value regardless of the input current

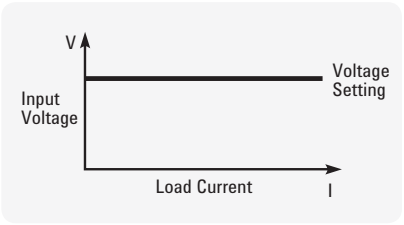
CR= ratio of voltage to current while maintaining the programmed resistance value



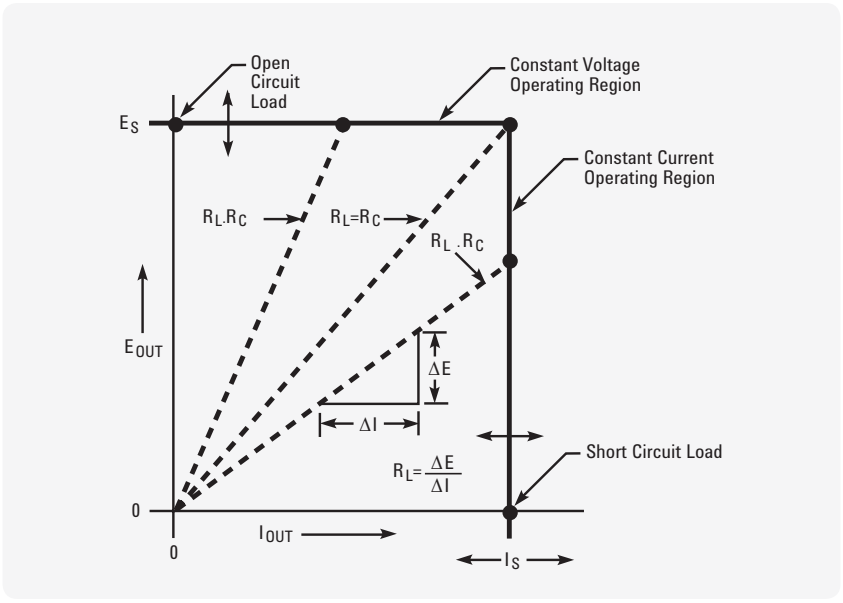
Constant-current mode



Constant-resistance mode



Constant-voltage mode



Constant-voltage/constant-current output characteristics

Constant-current/voltage/resistance regulation: the change in the steady-state value of the stabilized electronic load input voltage, current, or resistance resulting from a full scale source change, with all other influence quantities held constant.

Constant-voltage (CV) mode: a power supply that stabilizes output voltage with respect to changes in influence quantities. Thus, for a change in load resistance, the output voltage remains constant while the output current changes by whatever amount necessary to accomplish this.

Constant-voltage/constant current (CV/CC) power supply: a power supply that operates as a constant-voltage power supply or a constant-current power supply, depending on load conditions. The supply acts as a constant-voltage source for comparatively large values of load resistance and as a constant-current source for comparatively small values of load resistance.

Power Products Terms (Continued)

Constant-voltage/current limiting (CV/CL) power supply: a power supply similar to a constant-voltage/constant-current supply except that at comparatively small values of load resistance, its output current is limited instead of being stabilized.

Crest factor: the ratio of the zero-to-peak value to the rms value of a waveform. This term is often used to specify the maximum peak amplitude that an AC power supply can source (relative to its maximum rms rating) without distortion.

Crowbar: see overvoltage protection.

Current limiting: the action, under overload or short-circuit conditions, of limiting the output current of a constant-voltage supply to some predetermined maximum value (fixed or adjustable) and automatically restoring the output voltage to its normal value when the overload or short circuit is removed. There are three types of current limiting:

- by constant-voltage/constant-current crossover
- by decreasing the output voltage as the current increases
- by decreasing both voltage and current as the load resistance decreases.

DFI: a TTL compatible output signal that can be used as an alarm and automatically initiates an action for multiple power supply or electronic load shutdown. The DFI signal is commonly connected to RI of the next supply. (See RI)

Downprogramming: the ability of a power supply to discharge its output capacitors independently of load. The use of an active down programming device can reduce the fall time of the output voltage.

Drift: the maximum change of a power supply output or load input voltage or current during an 8-hour period following a 30-minute warmup, with all influence and control quantities maintained constant during the warm-up time and the period of drift measurement. Drift includes both periodic and random deviations over the bandwidth from zero frequency (DC) to a specified upper frequency limit.

Efficiency: expressed in percent, efficiency is the total output power of the supply divided by the active input power. Unless otherwise specified, Agilent measures efficiency at maximum rated output power and at worst case conditions of the AC line voltage.

Electromagnetic interference (EMI): any type of electromagnetic energy that could degrade the perfomance of electrical equipment. The EMI generated by a power supply can be propagated either by conduction (via the input and output leads) or bt radiation from the units' case. The terms "noise" and "radio-frequency interference" (RFI) are sometimes used in the same context.

Electronic load: an active device which absorbs power. Loads are used for the testing of the power producing products.

Foldback: immediate shutdown of the power supply output when a crossover between constant voltage and constant current mode occurs. Both the voltage and current levels are reduced (folded back).

Harmonics: the occurrence of this type of distortion is based upon the mathematical principle that all periodic waveforms are made up of a series of sine waves. As a result, harmonic distortion is produced at frequencies that are integer multiples of the fundamental or desired signal frequency. When viewed in the frequency domain, harmonics have an amplitude (often expressed in db), frequency, and phase characteristic relative to the fundamental.

Isolation: the maximum voltage (including output voltage) either output terminal may be floated from earth ground.

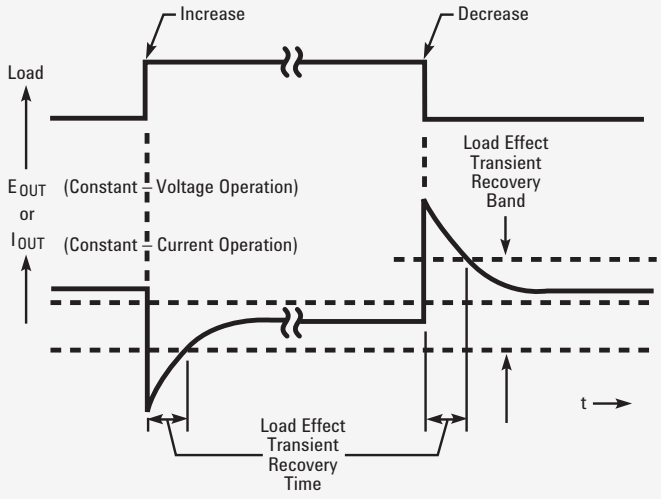
Load cross regulation: the affect on one output of a multiple output power supply when another output is programmed from zero to full rated current.

Power Products Terms (Continued)

Load effect: also known as "load regulation". Load effect is the change in the steady-state value of the stabilized output voltage or current resulting from a full-load change in the load current of a constant-voltage supply or the load voltage of a constant-current supply, with all other influence quantities maintained constant.

Load effect transient recovery time: the time interval between a specified step change in the load current of a constant-voltage supply (usually a full-load or 5-amp change, whichever is smaller) or in the load voltage of a constant-current supply and the instant when the stabilized output quantity returns to and stays within a specified transient recovery band.

Master-slave operation: a method of interconnecting two or more supplies or electronic loads such that one of them (the master) serves to control the others (the slaves). The outputs of the slave supplies or inputs of the slave electronic loads always remain equal to or proportional to the output of the master. The outputs of the master supply and of one or more slaves may be connected in series, in parallel, or with just their negative or positive output terminals in common. (See also "complementary tracking"). The inputs of the master electronic load and one or more slaves may be connected in parallel only.



Load effect transient recovery waveforms

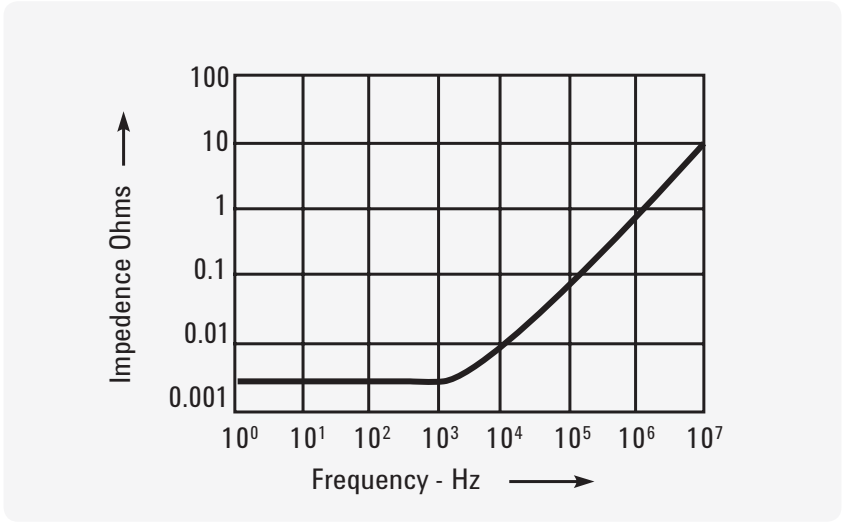
Minimum transition time: the shortest possible time in which an electronic load input can change from one level to another. This is determined by the small signal bandwidth of the load.

Modulation: analog programming of the output voltage and/or current. The output programming response time determines the maximum slew rate at which the power supplies output can be programmed.

Nominal value: the value that exists "in name only"; not the actual value. For example, in the case of a power supply with a calibrated output control, the nominal value is the value indicated by the control setting. For a supply with a fixed output, the nominal output is the output indicated on the nameplate. The nominal value of a 120-volt ±10% line voltage is 120 volts.

"One-box": a power supply that can be controlled by direct connection to a computer (with no additional programmers) and that can provide measured data to a computer without external voltmeters or ammeters.

Power Products Terms (Continued)



Typical output impedence of a constant voltage power supply

Output impedance: at any frequency of load change, ΔEout/ΔIout. Strictly speaking, the definition applies only for a sinusoidal load disturbance, unless the measurement is made at zero frequency (DC). The output impedance of an ideal constant voltage power supply would be zero at all frequencies, while the output impedance for an ideal constant current power supply would be infinite at all frequencies.

Overcurrent protection: protection of the power supply, electronic load and/or connected equipment against excessive output current.

Overvoltage protection: protection of the power supply, electronic load and/or connected equipment against excessive output voltage. Overvoltage protection is usually by means of a crowbar protection circuit, which rapidly places a low resistance shunt across the supply's output terminals to reduce output voltage to a low value if a predetermined voltage is exceeded. A supply equipped with an overvoltage crowbar must also be protected by a means for limiting or interrupting the output current.

Peak-to-peak noise: is the range between maximum and minimum noise level. Sometimes called noise "spikes." Peak-to-peak noise is typically low in energy and does not show up in a RMS measurement, 20-20 Mhz.

Phase angle: specifies the time domain phase relationship between two sine waves. The unit of phase angle is the degree, with one cycle corresponding to 360 degrees of phase.

Programming speed: the maximum time required for the programmed output voltage or current to change from a specified initial value (usually zero or maximum output) to a value within a specified tolerance band of a specified newly programmed value (for most models 99.9% or 0.1% of maximum output, respectively) following the onset of a step change in an analog programming signal, or the gating of a digital signal.

Readback: the ability of a power supply or electronic load to measure its actual output voltage and/or current, and provide the reading to a computer.

Remote sensing: remote sensing, or remote error sensing, is a means by which a power supply or electronic load monitors the stabilized voltage directly at the load or source respectively, using extra sensing leads. The resulting circuit action compensates for voltage drops up to a specified limit in the load leads.

Resolution: for a bench supply, the smallest change in output voltage or current that can be obtained using the front panel controls. For a system supply or electronic load, the smallest change that can be obtained using either the front panel controls, or a computer.

Reverse voltage protection: protection of the power supply or electronic load against reverse voltage applied at the outputor input terminals.

Power Products Terms (Continued)

RI (discrete fault indicator/remote inhibit): a rear-panel port that can be used to disable the power supply output independently of the GPIB. This port can also be used to chain multiple power supplies together such that an emergency shutdown of one output automatically signals the other supplies to disable their outputs.

Ripple and noise (dB): a term often used to specify rms or peak AC source noise relative to the maximum rms or peak output rating. The specification is calculated as follows: dB = 20 Log (V_{noise}/V_{rating}).

Rms (or effective) amplitude or noise: an average signal or noise level based on energy content. The root mean square (rms) content is often called the AC component.

SCPI (Standard Commands for Programmable Instruments): is a programming language for controlling instrument functions over the GPIB (IEEE 488) instrument bus. The same SCPI commands and parameters control the same functions in different classes of instruments.

Serial link: a means by which up to 16 power supplies with this feature can share one GPIB primary address. The power supplies can be connected with cables similar to U.S. modular telephone cables. They are independently controlled using GPIB secondary addressing.

Series regulation: power supplies designed with this topology have fast programming speeds and low noise. Also referred to as a "linear" topology.

Slave operation: see "master-slave operation".

Slew rate: for any given electronic load input transition, the change in current or voltage over time.

Source effect: also known as "line regulation", source effect is the change in the steady-state value of the stabilized output or input voltage or current resulting from any change in the AC source voltage within its specified range, with all other influence quantities maintained constant. Source effect may be measured at any output or input voltage and current within rating.

Specifications: describe the power supply or electronic load warranted performance.

Supplemental characteristics: give typical but nonwarranted performance parameters.

Switching regulation supplies: power supplies designed with this topology are efficient and can have laboratory-grade specifications.

Temperature effect coefficient: the maximum steady-state change in a power supply's output voltage or current or electronic load's input voltage or current per degree Celsius following a change in the ambient temperature within specified limits, with all other influence quantities maintained constant.

Total harmonic distortion: the ratio of the rms sum of the harmonic components to the rms value of a periodic waveform. This is typically expressed as a percent or in decibels (dB).

Voltage limiting: the action of limiting the output voltage of a constant-current supply to some predetermined maximum value (fixed or adjustable) and automatically restoring the output current to its normal value when the load conditions are restored to normal. There are two types of voltage limiting:

- by constant voltage/constant current crossover
- by decreasing the output current as the voltage increases

Warm-up time: the time interval from when a power supply or electronic load is turned on until its output complies with all performance specifications.

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* These products are closest in ratings to the discontinued model, but are not identical. Refer to the catalog for the features and specifications of the suggested alternative products.

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